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# ACTA LINGUISTICA HUNGARICA
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# ACTA LINGUISTICA HUNGARICA

## AN INTERNATIONAL JOURNAL OF LINGUISTICS




**AKADÉMIAI KIADÓ**

**BUDAPEST**

# ACTA LINGUISTICA HUNGARICA

VOLUME 49, NUMBER 1, 2002

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CONTENTS

# GUEST EDITOR'S NOTE

The papers presented here constitute the second instalment of a thematic issue of *Acta Linguistica Hungarica* devoted to historical linguistics (see Volume 48, Number 4 for the first part). In the present selection, the majority of papers represent historical syntax, although other topics are also covered.

The paper on historical phonology (Hegedűs) discusses problems of the development of the system of Hungarian short vowels. The changes that that system underwent are described as a process in which a certain cross-effect can be observed in that vowels in stressed and unstressed syllables were affected by changes of the opposite direction, and then the results of those changes mutually influenced one another. In expounding his own theory, the author critically comments on recent and not so recent claims in historical phonology.

The process of morphological separation with functional division of labour is analysed on the basis of three pairs of Hungarian lexemes in a paper by Piroska B. Gergely. The general claim of the paper is that it is synchronic system-internal factors (within a stage in historical development) that underlie the loosening or indeed tightening of the relevant morphological, semantic or functional relationships that results in diachronic changes.

A paper analysing the Hungarian system of non-finite verb forms in a historical perspective categorises those verb forms in terms of whether they typically occur in NPs or in VPs. The author establishes a connection between the ancient origin of NP-internal non-finite verb forms, the morphological structure of their suffixes, and the diversity of their functions. She also touches upon morphological and functional characteristics of VP-internal non-finite verb forms, classifying a larger collection of form types as "non-finite verb forms" than standard descriptive grammars do (Jászó).

Old Hungarian can be characterised as a set of geographical varieties; however, certain facts point towards the beginnings of normative efforts, too. Given that the extant documents coming from that period are mainly translations from Latin, such normative efforts can be observed primarily in the work of translators. Another paper of this volume presents two developments of that type in detail (Papp). In one of them, the linguistic forms that took shape (or were consciously created) did not subsequently become generally valid throughout the linguistic community; whereas in the other case the structures (known as "special circumstantial constructions") may have had an impact on the literary language of later periods.

The emergence and later changes of compound and complex sentences were determined by a number of fundamental linguistic processes taking place in the course of the centuries. The next paper of this collection analyses grammaticalisation, the process that had a major role in shaping that part of the grammar of Hungarian, but it also deals with ellipsis, analogy, as well as changes resulting from syntactic synonymy (Haader). The paper describes the lines of development belonging here in terms of a microdiachronic approach, and summarises the generalisations that can be made in those terms.

Katalin Gugán's paper investigates participial constructions and their syntactic synonyms (subordinate clauses, coordinate clauses, and nominal phrases) in corresponding passages of ten different Hungarian translations of the Bible. The aim of the paper is twofold: first, to analyse secondary semantic differences observable among constructions of the same referential meaning, and second, to trace the relative frequency of the relevant structures in the various historical periods and discuss the structural characteristics of a syntactic change resulting from the fact that participial constructions gradually lost ground.

*Lea Haader*

# LIST OF ABBREVIATIONS

AkH. = *A magyar helyesírás szabályai* [The rules of Hungarian spelling]. 11th edition. Akadémiai Kiadó, Budapest, 1984.

An. = Anonymus, *Gesta Hungarorum* (around 1200).

ApMélt. = *Könyvecse az szent apostoloknak méltóságokról* [A little book on the honour of the Holy Apostles] (1521).

AporK. = *Apor-kódex* (after 1416/around 1490).

BécsiK. = *Bécsi Kódex* (after 1416/around 1450).

BirkK. = *Birk-kódex* (1474).

BodK. = *Bod-kódex* (around 1520).

BogA. = Bogáti Fazekas, Miklós, *Széphistória az tökéletes asszonyállatokról* [Lay on the perfect woman beasts] (1577).

BornÖrd. = Bornemisza, Péter, *Ördögi kísértetek* [Evil ghosts] (1578).

BUNy. = Hajdú, Péter, *Bevezetés az uráli nyelvtudományba* [Introduction to Uralic linguistics]. 2nd edition. Tankönyvkiadó, Budapest, 1973.

CD. = Fejér, György, *Codex diplomaticvs Hungariae ecclesiasticvs I–XI.* Buda, 1829–1844.

CIFU. = Ortutay, Gyula (ed.), *Congressus internationalis fennougristarum Budapestini habitus 20–24. IX. 1960.* Akadémiai Kiadó, Budapest, 1963.

CornK. = *Cornides-kódex* (1514–1519).

CzechK. = *Czech-kódex* (1513).

CzF. = Czuczor, Gergely – Fogarasi, János, *A magyar nyelv szótára I–VI* [A dictionary of the Hungarian language]. Emich, [later] Athenaeum, Pest, [later] Budapest, 1862–1874.

DebrK. = *Debreceni Kódex* (around 1519).

DomK. = *Domonkos Kódex* (1517).

DöbrK. = *Döbrentei-kódex* (1508).

DömAd. = *A dömösi prépostság adománylevele* [The deed of gift of the provostal church of Dömös] (1138/1329).

ÉKsz. = Juhász, József–Szőke, István – O. Nagy, Gábor – Kovalovszky, Miklós (eds), *Magyar értelmező kéziszótár* [A concise dictionary of definitions of Hungarian]. Akadémiai Kiadó, Budapest, 1972.

EnyG. = Enyedi, György, *Gismunda és Gisquardus históriája* [The story of Gismunda and Gisquardus] (1577).

ÉrdyK. = *Érdy-kódex* (1524–1527).

ÉrsK. = *Érsekújvári Kódex* (1529–1531).

ÉrtSz. = *A magyar nyelv értelmező szótára I–VII* [A dictionary of definitions of Hungarian]. Akadémiai Kiadó, Budapest, 1959–1962.

EWUng. = Benkő, Loránd (ed.), *Etymologisches Wörterbuch des Ungarischen I–III.* Akadémiai Kiadó, Budapest, 1993–1997.

FestK. = *Festetics-kódex* (around 1493).

GuaryK. = *Guary-kódex* (before 1495).

GyS. = *Gyulafehérvári Sorok* [Lines from Gyulafehérvár] (the second half of the 13th century).

HB. = *Halotti Beszéd* [Sermo super sepulchrum] (the end of the 12th century).

HBK. = *A Halotti Beszédet követő Könyörgés* [The Prayer following Sermo super sepulchrum] (the end of the 12th century).

HeltR. = Heltai, Gáspár, *A részegségnek és tobzódásnak veszedelmes voltáról való dialógus* [Dialogue on the dangers of drunkenness and carousal] (1552).

HeltV. = Heltai, Gáspár, *Vigasztaló könyvecske* [A comforting little book] (1553).

HorvK. = *Horvát-kódex* (1522).

HorvKr. = Horváth, Gergely, *Az Krisztus testének ... jelen voltáról* [On the present existence of Christ's body] (1587).

ItK. = *Irodalomtörténeti Közlemények* [Studies in the History of Literature] (journal).

JókK. = *Jókai-kódex* (after 1372/around 1448).

JordK. = *Jordánszky-kódex* (1516–1519).

Káldi = *Szent Biblia* [Holy Bible]. Translated by György Káldi, Vienna, 1626.

Kat. = *Ószövetségi és Újszövetségi Szentírás* [The Old and New Testaments of the Holy Bible]. Translated and commented by Dr. Ferenc Gál and Dr. István Kosztolányi. Szent István Társulat, 1976.

KárK. = Károlyi, Gáspár, *Két könyv* [Two books] (1563).

Károlyi = Károlyi, Gáspár, *Szent Biblia* [Holy Bible] (1590).

KazK. = *Kazinczy-kódex* (1526–1541).

KeszthK. = *Keszthelyi Kódex* (1522).

KJB. = *The King James Bible* [CD-ROM]. The Folio Views database of nine full-text Bible translations. Ver. 5.0. Arcanum databases, Budapest, 1997.

KLev. = Hegedűs, Attila – Papp, Lajos (eds), *Középkori leveleink (1541-ig)* [Hungarian medieval letters (until 1541)]. Tankönyvkiadó, Budapest, 1991.

KNV. = *Ó- és Újszövetségi Szentírás a Neovulgáta alapján.* [The Old and New Testaments of the Holy Bible based on Neovulgata]. Szent Jeromos Bibliatársulat, Budapest, 1997.

KrisztL. = *Krisztina-legenda* (around 1510).

KT. = *Königsbergi Töredék* [Königsberg Fragment] (the beginning of the 13th century).

KTSz. = *Königsbergi Töredék Szalagjai* [Stripes of Königsberg Fragment] (the beginning of the 13th century).

KulcsK. = *Kulcsár-kódex* (1539).

LobkK. = *Lobkovitz-kódex* (1514).

LányiK. = *Lányi-kódex* (1519).

MA. = Szenczi Molnár, Albert, *Dictionarivm Latinovngaricum, II: Dictionarivm Vngarico-Latinum.* Nürnberg, 1604.

MargL. = *Margit-legenda* [Margaret legend] (1510).

Márton = Márton, József, *Új német–magyar és magyar–német lexicon, vagyis szókönyv. I. Német–magyar rész* [New German–Hungarian and Hungarian–German dictionary. Part I: German–Hungarian]. Vienna, 1799. *II. Magyar–német rész* [Part II: Hungarian–German]. Pozsony, 1800.

MGr. = Keszler, Borbála (ed.), *Magyar grammatika* [Hungarian grammar]. Nemzeti Tankönyvkiadó, Budapest, 2000.

MMNyjR. = Imre, Samu, *A mai magyar nyelvjárások rendszere* [The system of modern Hungarian dialects]. Akadémiai Kiadó, Budapest, 1971.

MNy. = *Magyar Nyelv* [Hungarian Language] (journal).

MNyA. = Deme, László – Imre, Samu (eds), *A magyar nyelvjárások atlasza I–VI* [The atlas of Hungarian dialects]. Akadémiai Kiadó, Budapest, 1968–1977.

MSzFE. = Lakó, György (ed.), *A magyar szókészlet finnugor elemei I–IV* [The Finno-Ugric elements of the Hungarian word-stock I–IV]. Akadémiai Kiadó, Budapest, 1967–1981.

MünchK. = *Müncheni Kódex* (after 1416/1466).

NádK. = *Nádor-kódex* (1508).

NagyszK. = *Nagyszombati Kódex* (1513).

Népr. és Nytud. = *Néprajz és Nyelvtudomány* [Ethnography and Linguistics] (journal).

NévtÉrt. = *Névtani Értesítő* [Journal of Onomastics] (journal).

NyK. = *Nyelvtudományi Közlemények* [Proceedings in Linguistics] (journal).

Nyr. = *Magyar Nyelvőr* [Journal of Cultivating the Hungarian Language] (journal).

NySz. = Szarvas, Gábor – Simonyi, Zsigmond, *Magyar nyelvtörténeti szótár a legrégibb nyelvemlékektől a nyelvújításig I–III* [A historical dictionary of Hungarian from the earliest records until the time of language reform I–III]. Hornyánszky Viktor Akadémiai Könyvkereskedése, Budapest, 1890–1893.

NytudÉrt. = *Nyelvtudományi Értekezések* [Papers in Linguistics] (series).

OklSz. = Szamota, István – Zolnai, Gyula, *Magyar oklevél-szótár* [A dictionary of Hungarian documents]. Hornyánszky Viktor Könyvkereskedése, Budapest, 1902–1906.

ÓMOlv. = Jakubovich, Emil – Pais, Dezső (eds), *Ó-magyar olvasókönyv* [An Old Hungarian reader]. Danubia, Pécs, 1929.

ÓMS. = *Ómagyar Mária-siralom* [Lamentations of Mary in Old Hungarian] (the middle of the 13th century).

ON = place name.

PatE. = Pataki Névtelen, *Eurialus és Lucretia* [Eurialus and Lucretia] (1577).

PeerK. = *Peer-kódex* (around 1518).

PéldK. = *Példák Könyve* [Book of apologues] (1510).

Pesti = Pesti, Gábor, *Új testamentum magyar nyelven* [The New Testament in Hungarian] (1536).

PestiE. = Pesti, Gábor, *Esopus fabulái* [Aesop's fables] (1536).

PN = personal name.

PP. = Pápai Páriz, Ferenc, *Dictionarium manuale Latino–Ungaricum et Ungarico–Latinum.* Lőcse [Levoča], 1708.

PPB. = *Dictionarium Latino–Hungaricum et Ungarico–Latinum* [The revised edition of PP., edited by Péter Bod]. Nagyszeben [Sibiu], 1767.

Prot. = *Biblia. Istennek az Ószövetségben és Újszövetségben adott kijelentése.* [Bible. Old and New Testament]. A Református Zsinati Iroda Sajtóosztálya, Budapest, 1975.

RMGl. = Berrár, Jolán – Károly, Sándor (eds), *Régi magyar glosszárium. Szótárak, szójegyzékek és glosszák egyesített szótára* [An Old Hungarian glossary. A joint dictionary of dictionaries, indices and glossaries]. Akadémiai Kiadó, Budapest, 1984.

RMNy. = *Régi magyarországi nyomtatványok* [Old Hungarian prints]. Akadémiai Kiadó, Budapest, 1971.

RMNyA. = Murádin, László (collector)–Juhász, Dezső (ed.), *A romániai magyar nyelvjárások atlasza* I–V [The atlas of Hungarian dialects in Romania]. Magyar Nyelvtudományi Társaság, Budapest, 1995–1999.

SándK. = *Sándor-kódex* (around 1518).

Sylvester = Sylvester, János, *Új Testamentum* [New Testament] (1541).

SzékK. = *Székelyudvarhelyi Kódex* (1526–1528).

SzófSz. = Bárczi, Géza, *Magyar szófejtő szótár* [Hungarian etymological dictionary]. Budapest, 1941.

SzT. = Szabó T., Attila (ed.), *Erdélyi magyar szótörténeti tár* [A historical dictionary of Transylvanian Hungarian]. Vol. I–IV: Kriterion Könyvkiadó, Bukarest, 1975–1984. Vol. V–IX: Akadémiai Kiadó, Budapest, 1993–1997.

SztárÉ. = *Sztárai Mihály énekei (Huszár Gál-énekeskönyv)* [The songs of Mihály Sztárai (Gál Huszár Songbook)] (1574).

SztárIg. = Sztárai, Mihály, *Igaz papságnak tüköre* [The mirror of true priesthood] (1559).

SztárIl. = Sztárai, Mihály, *Szent Illyésnek ... idejében lött dolgokból* [Events from the time of St. Elias] (Hofgreff Songbook, 1554–1555).

TA. = *A tihanyi apátság alapítólevele* [The deed of foundation of the Abbey of Tihany] (1055).

TelK. = *Teleki-kódex* (1531).

TESz. = Benkő, Loránd (ed.), *A magyar nyelv történeti-etimológiai szótára I–IV* [A historical-etymological dictionary of the Hungarian Language]. Akadémiai Kiadó, Budapest, 1967–1984.

TihK. = *Tihanyi Kódex* (1532).

TLev. = Eckhardt, Sándor (ed.), *Két vitéz nemesúr, Telegdy Pál és János levelezése a XVI. század végéről* [Two gallant noblemen, the correspondence of Pál and János Telegdy at the end of the 16th century]. Királyi Magyar Pázmány Péter Tudományegyetem Magyarságtudományi Intézet, Budapest, 1944.

TNyt. = Benkő, Loránd (ed.), *A magyar nyelv történeti nyelvtana I, II/1, II/2* [A historical grammar of Hungarian]. Akadémiai Kiadó, Budapest, 1991, 1992, 1995.

TÖ. = *A tihanyi apátság javainak összeírása* [The conscription of the belongings of the Abbey of Tihany] (1211).

Tzs. = *Magyar és német zsebszótár I–II* [Hungarian–German pocket dictionary]. Magyar Tudós Társaság, Buda, 1835–1838.

UNyA. = Hajdú, Péter, *Az uráli nyelvészet alapkérdései* [Fundamental issues in Uralic linguistics]. Tankönykiadó, Budapest, 1981.

UEW. = Rédei, Károly (ed.), *Uralisches etymologisches Wörterbuch I–III*. Akadémiai Kiadó, Budapest, 1986–1991.

Úsz. = Varga, Endre (ed.), *Úriszék. XVI–XVII. századi perszövegek* [Manorial court. Texts of lawsuits from the 16th–17th century]. Akadémiai Kiadó, Budapest, 1958.

VásI. = Vásárhelyi, Gergely, *Imádságok* [Prayers] (1599).

VirgK. = *Virginia-kódex* (before 1529).

VitkK. = *Vitkovics-kódex* (1525).

WeszprK. = *Weszprémi-kódex* (around 1512).

WinklK. = *Winkler-kódex* (1506).

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# ÜBER EINIGE INNERSPRACHLICHE ZUSAMMENHÄNGE ZUR STEUERUNG VON SPRACHWANDEL

PIROSKA B. GERGELY

## Auszug

Heutzutage es ist allgemein verbreiteter Brauch in der historischen Sprachwissenschaft, dass diachrone Ergebnisse aus der synchronen Untersuchung der früheren Entwicklungsperioden der Sprache gezogen werden, um die Ursachen der linguistischen Veränderungen schlechterdings aufzudecken. Diese Arbeit versucht die Ursachen und den Prozess von morphophonologischen und morphosyntaktischen Veränderungen in der ungarischen Sprache sichtbar zu machen, die aus den inneren sprachlichen Zusammenhängen der mittel- und neuungarischen Perioden stammen und sich aus ihnen erklären lassen. Die untersuchten diachronen Erscheinungen gehören zu verschiedenen Änderungstypen. Sie können repräsentieren:

1. Systemzwang (wie im Falle des paradigmatischen Ausgleiches des Stammes *idő* 'Zeit');
2. Trennung von Form und Funktion (wie z.B. die diachrone Verbindung des Verbalpräfixes *át-* und der Postposition *által* 'durch') und
3. Wechselentwicklung der grammatischen Synonyme (wie z.B. Alternation der temporalen Bestimmungen *mindéltig* ~ *mindig* 'immer').

Die Ursachen dieser Änderungen stammen aus dem synchronen System der gegebenen Periode und deuten darauf hin, dass allgemeine morphologische, semantische und funktionale Einflüsse ihres synchronen Verbindungssystems ihre historischen Veränderungen determinieren.

**1.** „Synchronie ist die Schmiede der Diachronie" — der Inhalt dieser weit verbreiteten und schönen wissenschaftlichen Metapher ist zur allgemeinen Methodik unserer sprachgeschichtlichen Forschungen geworden. Wenn die Möglichkeit gegeben ist, über den Sprachzustand vergangener Epochen eingehende Kenntnisse zu sammeln — unterstützt durch ein möglichst breites und vielfältiges sprachhistorisches Quellenmaterial —, so können wir entlang der Fäden der synchronen Zusammenhänge zu den meist komplexen Ursachen einzelner Sprachwandelphänomene gelangen, die sich aus den komplizierten Verflechtungen interner sprachlicher Zusammenhänge ergeben.

In der vorliegenden Arbeit wird mit Hilfe der oben skizzierten Methode auf den Verlauf und die Ursachen einiger Wandelphänomene eingegangen, die sich zwischen dem 16–19. Jahrhundert abgespielt haben, in einer Zeit, aus der uns die meisten Daten der ungarischen Sprachgeschichte zur Verfügung stehen. Als Quelle dienten in erster Linie sprachhistorische und andere Wörterbücher, aber vor allem die üppigste Datenquelle dieser Epoche: *Erdélyi magyar szótörténeti tár* (= SzT., Historisches Wörterbuch des siebenbürgisch-ungarischen Wortschatzes).

**2.** Die Entstehung verschiedener Varianten des Stammes *idő* ('Zeit', *ideje* 'seine Zeit', *idén* 'heuer, dieses Jahr') sind gut belegt (Bárczi 1958, 36). Wir wissen auch, dass die auf *-é* auslautende Stammvariante im Altungarischen weiter verbreitet war als heute, sie trat auch in Formen auf, aus denen sie durch die Variante mit *-ő* verdrängt wurde. Diese Stammvariante lebt heute nur noch in den Wörtern *idén* 'heuer' und *idétlen* '(im Verhalten) unreif, in Form komisch, nicht gelungen' weiter, aber nur noch latent, da die Verbindung von ersterem zum Stammwort aufgrund der verblichenen Bedeutung von 'Jahr' in *idő* sich sehr gelockert hat, letzteres wiederum hat sich durch seine Bedeutung 'dumm, entstellt, unförmig' stark von der ursprünglichen Wortfamilie 'Zeit' isoliert.

In der mittelungarischen Zeit zeigt sich eine starke Schwankung innerhalb zweier Gruppen der Paradigmen der morphologischen Stammvarianten von *idő*. Die eine Gruppe besteht aus einer Reihe von Formen mit Possessivsuffix, wo neben den für die 3. Person bis heute gültigen Stammwechselformen (*ideje* 'Zeit + 3. P. Sg.' – *idejük*, mittelung. *idejek* 'Zeit + 3. P. Pl.') das Substantiv *idő* in der Bedeutung „Lebensdauer" in der 1. Person Singular und Plural häufig als Stammvariante mit *-é* vorkam (*idém* 'Zeit + 1. P. Sg.', *idénk* 'Zeit + 1. P. Pl.'), besonders im 16–17. Jh., vereinzelt auch noch am Anfang des 18. Jh.[1]

Beispiele: 1560: „vagion ... wy haz kyt az en *idemben* wy helyre chinaltak" 'Es gibt ein neues Haus, das *in meiner Zeit* an neuer Stelle gemacht worden ist' (Néc SzD); 1568: „my *Jdenkbe* Jllyen kǫtest tǫttwnk hogy valaky ez dolgot haborgatna f. 20 maraggyon" 'Wir haben *in unserer Zeit* eine solche Verpflichtung auf uns genommen, dass wenn jemand diese Sache durcheinanderbringt, er 20 Forint Strafe zahlen soll' (Kv); 1668: „az utan bujdosztanak el ..., en *idemb(en)* szarmasztanak vala haza" 'Sie sind danach in die Fremde gezogen ... *in meiner Zeit* kamen sie nach Hause' (Đés); 1754: „Mindenkor *idémben*

[1] Die zitierten Belege sind dem SzT. entnommen. Nach dem zitierten Beleg folgt — hier und im Folgenden — in Klammern ein Verweis auf den Ort, zu den Abkürzungen vgl. SzT., Bd. 5, VII–VIII.

tilalom alatt tartatott a nevezett Bűk erdő" '*In meiner Zeit* stand der genannte Buchenwald immer unter Verbot' (Alfalu Cs).

Die andere Paradigmengruppe, in der die Stammvariante auf *-é* in derselben Epoche häufig vertreten ist, setzt sich aus den Ableitungen auf *-s* in der Bedeutung 'alt, bejahrt' zusammen. Von ihren Vorkommen — auch in chronologischer Hinsicht — gibt in erster Linie das reiche Datenmaterial des SzT. Auskunft (im NySz. stehen lediglich einige literarische Belege aus dem 16. Jh.).[2]

Beispiele: 1561: „Az *ides* vín Embereknek az o allapattiok es ideiek zerent illendo tiztessegek megadassek" 'Den *betagten* alten Leuten soll die Ehre nach ihrem Lebensalter und ihrer gesellschaftlichen Stellung gegeben werden' (Kv); 1575: „A hatarokra legien gongia eo kegnek lassak es Iaryak meg, ha my Igazgatas zwkseges benne ... vigenek *Ides* embereket kyk twgiak, Ifyakatis ky (!) Tanwlliak megh" 'Ihr sollt Euch um die Gemarkung kümmern, sie anschauen und begehen; sollte irgendeine Veränderung nötig werden, sollen *alte* Leute mitgenommen werden, die es wissen, und junge, die es lernen sollen' (Kv); 1584: „Orsolia Istwan Kowachne Vgia(n) azont vallia, ezel teobiti hogy az *Jdesbik* wteotte le, az Iffiabbik ozta(n) vgy vagta" 'Die Frau vom Schmied István Orsolya bezeugt dasselbe, fügt aber hinzu, dass *der Ältere* ihn/sie niedergeschlagen und der Jüngere ihn/sie erst dann geschlagen hat' (Kv); 1594: „Zabo Andras vallia ... Beleniesi Andras ... Baiuz Marton ... *Idesbis* nallamnal kez vagiok megh keouetnem" 'András Szabó sagt aus: András Belényesi, Márton Bajusz ist *älter* als ich, ich bin bereit, ihn um Verzeihung zu bitten' (Kv); 1603: „az *Ides* vraimban gywtessenek be tizen hatig Awagy huzigh valot, es az njolcz oztozo vraimnak egyenleo Akaratbol Jrianak Articulusokat" 'Von unseren *alten* Herren sollen sechzehn bis zwanzig zusammengerufen werden und für die acht sich in das Vermögen teilenden Herren auf gemeinsamem Einverständnis beruhende Beschlüsse schreiben' (Kv); 1635/1650: „Vgian ezen Ceh giúlesekor vegesztek eo kglmek egesz Cehwl, *Ides* vraim mind ben leven" 'In der Versammlung derselben Zunft wurde mit Einverständnis der ganzen Zunft der Beschluss gefasst, unsere *alten* Herren waren alle anwesend' (Kv); 1674: „*Ides* Uramékkal eo kglmekkel édszeris másszoris magunkis ittunk megh égy tiz vedres általagh ürmeos bort" 'Mit unseren *alten* Herren haben wir auch selbst ab und zu ein Fass zu zehn Eimern Wermutwein getrunken' (Kv).

Das Übergewicht der Variante *idés* 'alt' gegenüber *idős* 'ds.' im 16. Jh. kann nicht für ein sprachgeographisches Phänomen gehalten werden — obwohl die relevanten Belege des SzT. alle aus demselben Ort: aus Kolozsvár (Klausen-

[2] Zu den nächsten und den weiteren Belegen vgl. den Artikel *idős, idősbik* im SzT. Ein Teil der zitierten Belege bezieht sich auf die „Senioren" des ehemaligen städtischen Großrats (centumviratus) bzw. der Zünfte.

burg, Cluj, Rum.) stammen—, da diese Formvariante bereits aus dem Münchener Kodex (TESz.) und aus dem Érdy-Kodex (NySz.) bekannt ist. Im 17. Jh. überwiegt die Variante mit *-ő*, obwohl aus diesem Jahrhundert auch noch die Variante *idés* belegt ist (1674). Der analogische Ausgleich zugunsten von *idős* scheint ab dem 18. Jh. endgültig zu sein, seit dieser Zeit kommt *idés, idésb* 'älter' im Beispielmaterial des NySz. oder des SzT. nicht mehr vor, nur noch *idős, idősb* 'älter'. Neben dem morphophonetischen Systemzwang kann als Ursache für den Wandel noch ein weiterer Aspekt herangezogen werden: die semantische Abkoppelung von *idős* 'alt' und *idétlen* 'frühzeitig; kindisch'. Zwischen diesen beiden Ableitungen mit Privativum bzw. mit dem Ableitungssuffix *-s* 'mit etwas versehen' wird durch die semantische Opposition eine enge Verbindung geschaffen, die im Falle von *idős* ~ *idés* – *idétlen* besonders in der Zeit stark gewesen sein kann, als sich letzteres semantisch noch nicht von seinem Grundwort abgekoppelt hatte und in der Bedeutung 'vorzeitig, frühzeitig' verwendet wurde.

Diese Bedeutung kann in syntaktischen Verbindungen wie *idétlen halál* 'frühzeitiger Tod', *idétlen kora* 'js. zu junges, unreifes Alter', *idétlen havak* 'frühzeitiger, zu früher Schneefall', *idétlen korán* 'zu früh' (NySz.) noch im 17–18. Jh. als lebendig nachgewiesen werden, obwohl die Weiterentwicklung dieser Bedeutung bereits früher, im späten Altungarischen eingesetzt haben kann, wie in Wortregistern aus dem 15. Jh. in solchen Wortfügungen wie *idétlen gyermek* 'frühes Kind', *idétlen szülés* 'frühzeitige Geburt' (RMGl.) sowie durch das erste Vorkommen des Wortes *idétlen* ohne syntaktische Ergänzungen im Jókai-Kodex belegt ist (TESz.). Durch die Bedeutung 'zu früh geboren, frühgeboren' wurde die semantische Verbindung von *idés* – *idétlen* bereits etwas gelockert, aber noch nicht aufgehoben. Die phonologische Gestalt *idétlen*, die meistens in der *é*-Variante vorkam, konnte also einen Einfluss auf die Lautgestalt der Ableitung *idés* mit dem Suffix *-s* ausüben, solange die semantische Opposition 'frühzeitig', 'zu früh' – 'alt' bestehen blieb. Als sich der Bedeutungswandel von *idétlen* allerdings fortsetzte und die Bedeutung 'frühzeitig', 'frühgeboren' immer mehr durch 'unentwickelt → formlos → unförmig' bzw. durch 'unreif → dumm' ersetzt wurde, hob sich die Opposition zu 'alt' und zugleich die stärkende Wirkung auf die Form *idés* auf. Nach der semantischen Ablösung von *idétlen* von der Wortfamilie *idő* übte der analogische Ausgleich eventuell einen stärkeren Einfluss aus, und die Form *idés* wurde durch *idős* ersetzt. Die Position von *idétlen* wiederum, die nun auch keine formalen Verbindungen zu der ursprünglichen Wortfamilie mehr vorweisen konnte, wurde durch eine neue privativische Ableitung gefüllt: durch das paradigmatisch besser passende *idötlen* 'zeitlos'.

Die Verdrängung der Stammvariante mit *-é* aus der Bedeutung 'alt' setzte sich in der Bedeutungssphäre 'Lebensdauer, Lebensalter' fort und kann auf die Abschaffung von *idém, idénk* '(in) mein(em) Leben, (in) unser(em) Leben' bzw. auf den Austausch durch die Varianten *időm, időnk* gewirkt haben.

Der paradigmatische Ausgleich der Stammvarianten kann also bei weitem nicht auf eine einzige Ursache: auf die vereinende Wirkung des formalen Systemzwangs zurückgeführt werden, sondern erfolgt durch die Zusammenwirkung mehrerer Sprachschichten—wie am oben analysierten Beispiel gesehen—dann und in dem Teil des Paradigmas, wo konvergente Wirkungen aus den unterschiedlichen Sprachschichten eingetroffen sind.

**3.** Die morphologische Verselbstständigung mit Funktionsteilung sowie der durch synchrone Verbindungen gesteuerte Prozess der Bindung einzelner grammatischer Formvarianten zu grammatischen Funktionen und deren Befestigung kann in der Geschichte des Präfixes *át* 'durch (etwas hindurch)' und durch die Postposition *által* 'durch ⟨Passiv⟩' im 16–19. Jh. verfolgt werden.[3]

Im 16. Jh. verfügt nur die Postposition *által* über eine längere und eine kürzere Variante, wobei *által* in lokaler, temporaler und abstrakterer, vor allem instrumentaler Funktion gleichermaßen reich belegt ist, die kürzere Form *ált* ist jedoch zunächst durch eine einzige Quelle nachgewiesen, in der sie temporale Funktion einnimmt (1519 LányiK. TESz.). Ihr Fehlen in diesem reich belegten Jahrhundert lässt vermuten, dass ihre Frequenz gering war.

Das Präfix nahm in dieser Zeit ausschließlich die längere Form *által* (seltener *átal*) an, ihre mit zahlreichen Verben bestehenden Verbindungen haben meistens einen richtungsweisenden oder temporalen Bezug. 114 Verbindungen mit 86 Verben sind im 16. Jh. im NySz. sowie SzT. belegt.

Der Wandel, der letztendlich dazu führte, dass die längere Variante als Präfix verdrängt und—zumindest in der Schriftsprache—durch eine kürzere Form ersetzt wurde, setzte im nächsten Jahrhundert ein. Meines Wissens erscheint das Präfix erst jetzt in der Form *ált*, ihr erstes Vorkommen ist aus der Murányi Vénus (Venus von Murány) Gyöngyösis bekannt: 1663/64: *ált-hattya* 'durchdrängt', *ált-kelte* 'überqueren (Part.)', *ált-ülte* 'übersetzen (Part.)' (Simai 1910, 165), sowie aus dem 18. Jh., aus dem Sprachgebrauch József Gvadányis: *ált-menvén* 'überquert (Part.)', *ált-hatott* 'durchdrängt (Part.)', *ált-húz* 'durchzieht' (NySz.).

[3] Zur Entstehungs- und Entwicklungsgeschichte der Postposition vgl. TNyt. I 450, 454; II/1 669–700, 704–7, 710–14; zu den Präfixen: I 436–37; II/1 664–66.

Das Material des SzT. bezüglich des 18. Jh. ist äußerst reichhaltig, so dass bei der Untersuchung des Präfixes gegen Ende des Jahrhunderts auf mehrere hundert Belege zurückgegriffen werden kann. In den Belegen kommt *ált* kein einziges Mal, ausschließlich *által* vor. Eine so starke Übereinstimmung zwischen dem Zeugnis der Belege deutet darauf hin, dass der Status von *által* als Hauptvariante des Präfixes noch gegen Ende des 18. Jh. fest war, während die Kurzform *ált* eher eine seltene Ausnahme und eventuell lediglich eine stilistisch gebundene Variante war. Ihre stilistische Ebene war m. E. vermutlich näher an der gebildeten Litaratursprache als an der Umgangssprache angesiedelt. Dabei ist natürlich nicht die spärliche Zahl der Belege von Gyöngyösi bzw. Gvadányi, sondern gerade deren Abweichung von den Belegen des SzT. ausschlaggebend, das den eher umgangssprachlichen Sprachgebrauch von niederen Beamten und von im öffentlichen Leben Aktiven, Meistern, Landwirten usw. festhielt.

Es scheint daher sinnvoll, den Wandel des Präfixes im 19. Jh. kurz zusammenzufassen, um dann anschließend die gegenseitige Wirkung der auf die Postposition bezogenen synchronen Verbindungen vorzustellen, die gegenseitig Veränderungen indiziert haben.

Die Form *át* erscheint als Präfix ab Ende der 1830-er Jahre immer häufiger: 1838–45: *átugordik* '(hin)überspringen', 1841: *átváltoztathatik* 'umgestaltet werden können', 1844: *átharapódzik* 'überhandnehmen', 1848: *átcsillent* 'hin/herübermausen', 1849: *átúszik* 'durchschwimmen', *átírás* 'Zuschrift', *átküld* 'überleiten', 1850: *átlépik* 'übertreten', *átlépendő* 'mit der Absicht des Übertritts (Part. Pass.)', *átléphetik* 'darf übertreten', *átlépés* 'Übertritt', *átléphetés* 'Übertrittsmöglichkeit', *átlépési* 'Übertritts- (Adj)', *átlépett* 'übergetreten' (SzT.). Bis zu den 1840-er Jahren wechseln sich die beiden Formen noch durchgehend ab, da auch Formen mit *által* oft vertreten sind. Z. B. 1833: *általvehetés* 'Übertritt', 1835: *általfolyó* 'durchfließend', *általszökő* 'durchziehend/schneidend', *általváltoztat* 'umtauschen/wechseln', *általvett* 'übernommen', 1837: *általláthat* 'verstehen können', 1840: *általkölcsönöz* '(leihweise) übergeben', 1842: *általtört* 'durchbrochen', 1844: *általadat* 'übergeben lassen', *általadható* 'zu (über)liefernd', *általjárogat* 'öfters herüberkommen', *általmos* 'hinüberschwemmen (an das jenseitige Ufer)', 1845: *általlép* '(durch)treten', 1849: *általadódott* 'übergeben', *általvesz* 'übernehmen' (SzT.).

Demnach sind die Formen *által* und *át* als Präfix bis zur Mitte des 19. Jh. parallele und gleichgestellte Varianten. Das Verhältnis kippt nach 1850 zugunsten von *át* um. Während *által* im SzT. ab den 50-er Jahren nur noch in zwei Verben bzw. deverbalen Ableitungen vorkommt, ist *át* in zwölf Verben belegt. Diese letztere Periode des Formwechsels — der Sieg von *át* über das Präfix *által* — verläuft allerdings auffallend schnell, die Zeit der Schwankung ist überraschend kurz, die Verdrängung von *által* findet fast ohne Übergang statt. Um auszuschließen, dass der damalige Sprachzustand nicht einfach durch die eventuellen Mängel bzw. Einschränkungen des SzT. verstellt wurde, unternahm ich eine flüchtige Untersuchung in Schriftwerken von Personen, die damals im literarischen und kulturellen Leben Siebenbürgens eine herausragende Rolle gespielt hatten und deren Werke in ihrem Charakter dem Quellmaterial des SzT. ähnlich sind, so z. B. in der Korrespondenz von Sámuel Teleki oder der beiden Bolyais und im Tagebuch von Sándor Bölöni Farkas, in den Erinnerungen von János Pálffy und, um einen Ausblick außerhalb des siebenbürgischen Sprachgebrauchs zu gewährleisten, in der Korrespondenz Kazinczys, in der Prosa Vörösmartys, in den Briefen Aranys an Petőfi sowie im Petőfi-Wörterbuch.[4] Diese Untersuchungen ergaben Folgendes: In den Briefen Sámuel Telekis zwischen 1760–1822 war die Variante *által* die ausschließliche Form. In der Korrespondenz der Bolyais kommt bis 1844 nur *által*, danach allerdings — nach kurzem Schwanken — nur noch *át* vor. In den Tagebuchfragmenten Sándor Bölöni Farkas' aus 1835–36 ist durch die wenigen Belege ausschließlich *által* dokumentiert. Die 1835–36 verfassten Erinnerungen János Pálffys zeigen neben einigen Beispielen mit *által* eine weitgehende Überlegenheit von *át*. Für die Sprache der Briefe von Kazinczy ist ebenfalls die Variante *át* charakteristisch, es kommt sogar einmal *ált* vor, wird aber nicht wiederholt. Die Angaben in Vörösmartys Prosawerk sind sehr vielsagend. In der 1829 erschienenen Übersetzung der *Tausend und eine Nacht* wird konsequent *által* benutzt. In seinen 1837 geschriebenen Erzählungen wechseln sich *által* und *át* ab, wobei letzteres ein Übergewicht hat. In den Briefen János Aranys an Petőfi aus 1847–49 kommt ausschließlich die Variante *át* vor. Im Petőfi-Wörterbuch sind 17 Verben mit dem Präfix *által* gegenüber 131 Verben mit *át* verzeichnet. *Által* kommt ausschließlich in seiner Dichtung vor. Aber selbst dort ist *át* sehr viel charakteristischer, in seiner Prosa ist es sogar die einzige Variante.

[4] Verwendete Ausgaben: Teleki Sámuel és a Teleki-téka. Téka sorozat [Sámuel Teleki und die Teleki-téka. Reihe Téka]. Kriterion, Bukarest, 1976; Bolyai-levelek. Téka sorozat [Bolyai-Briefe. Reihe Téka]. Kriterion, Bukarest 1975; Bölöni Farkas Sándor naplója. Téka sorozat [Tagebuch des Sándor Bölöni Farkas. Reihe Téka]. Kriterion, Bukarest, 1971; Kazinczy Ferenc levelezése. 23. kötet [Korrespondenz des Ferenc Kazinczy, Bd. 23]. Akadémiai Kiadó, Budapest, 1960; Vörösmarty Mihály Összes művei. 13. kötet [Gesammelte Werke von Mihály Vörösmarty, Bd. 13]. Akadémiai Kiadó, Budapest, 1974; Magyarországi és erdélyi urak. Pálffy János emlékezései. Sajtó alá rendezte Szabó T. Attila [Herren in Ungarn und Siebenbürgen. Memoiren des János Pálffy. Redigiert von Attila Szabó T.] Erdélyi Szépmíves Céh, 1939; Arany és Petőfi levelezése. Téka sorozat [Korrespondenz von Arany und Petőfi. Reihe Téka]. Kriterion, Bukarest, 1972; Petőfi-szótár I. [Petőfi-Wörterbuch I.]. Akadémiai Kiadó, Budapest, 1973.

Aus alledem folgt: (a) Die Perioden des Formwechsels von *által* und *át* spiegeln sich in der Sprache der Literatur genauso wieder wie in den Daten des SzT., mit dem Unterschied, dass die Variante *ált* bei Kazinczy und Vörösmarty vereinzelt bereits vor 1830 auftaucht. (b) Im Sprachgebrauch von Petőfi und Arany herrschte in der Autorensprache *át* bereits in den 40-er Jahren vor, sein Gebrauch ging also dem alltäglichen Sprachgebrauch etwas voraus. (c) Die Zeit des Wandels fällt also auf die Zeit, als die Spracherneuerung Früchte zu tragen begann, als die Reformzeit sprachlich ausgereift war, auf eine Zeit, in der das sprachliche Bewusstsein in der Entwicklung der Sprache am ausgeprägtesten war. All dies kann nach meiner Einschätzung als Erklärung für die Ursachen und den Ablauf dieses Wandels dienen.

Der außerordentlich schnelle Sieg von *át* über *által* ist vermutlich darauf zurückzuführen, dass die Variante vom literarischen Sprachgebrauch bewusst verbreitet wurde. Dass ein solches Bestreben tatsächlich bestand, lässt nicht nur der individuelle Sprachgebrauch der führenden Autoren erahnen, die den literarischen Sprachgebrauch unmittelbar formten — am meisten vielleicht Vörösmarty; es lässt sich auch durch das erste normative Wörterbuch des Wortgebrauchs, das vorwiegend unter Vörösmartys Mitwirkung erstellte, von der Ungarischen Wissenschaftlichen Gesellschaft 1838 herausgegebene *Magyar és német zsebszótár I. Magyar-német rész* (Ungarisch–deutsches Taschenwörterbuch) nachweisen. Zum Zeitpunkt seines Erscheinens war, wie das SzT. zeigt, der Kampf zwischen den beiden Varianten in der Alltagssprache längst noch nicht entschieden. Das *Ungarisch–deutsche Taschenwörterbuch* spiegelt jedoch nicht diesen Sprachzustand wider, sondern sozusagen richtungsweisend den, der erst in den 1850-er Jahren zur sprachlichen Wirklichkeit wird; das Wörterbuch führt nämlich insgesamt nur 15 Formen mit *által* an, die Zahl der Verben mit *át* beträgt hingegen 312. Dieses normativ ausgerichtete Wörterbuch legt es also deutlich darauf an, die Variante *át* gegenüber *által* zu popularisieren, wobei seine Autorität und allgemeine Verbreitung sicherlich eine Wirkung gehabt haben müssen. Im Falle von *át* hat die Literatursprache nicht das Ergebnis eines in der spontanen Sprachentwicklung bereits zu Ende gekämpften Kampfes angenommen, vielmehr hat sich der Kampf — anscheinend — durch die Stärke der literarischen Verwendung zugunsten von *át* entschieden.

Für die weitere Frage, warum die Variante *át* bevorzugt wurde, warum *által* seinen präfigalen Status zuerst im literarischen, dann im alltäglichen Sprachgebrauch verloren hat, können zwei Erklärungen herangezogen werden. Die eine ist die Vorliebe für kurze Wortformen, die sowohl im spontanen Sprachgebrauch als auch in den ästhetischen Bestrebungen der Spracherneuerer verbreitet war. Die andere ist die Bestrebung nach Distanzierung bzw. Unterscheidbarkeit von der ähnlichen Postposition.

Die semantisch-funktionelle Einschränkung der postpositionalen Formvarianten wird sich nämlich erst vollzogen haben, nachdem der Tausch der Formvarianten im Präfix bereits weit fortgeschritten war. *Által*, das auch als Postposition als Hauptvariante galt, kommt nämlich nicht nur in instrumentaler, sondern auch in lokaler und temporaler Funktion überaus häufig im Material des NySz. wie auch des SzT. während des 16–18. Jahrhunderts vor. Die formale Unterscheidung der Funktionen hat scheinbar nicht bei den Formvarianten, sondern bei dem Grundwort der postpositionalen Verbindung angefangen. Während sich der frühere Sprachgebrauch durch den funktional weniger differenzierten Gebrauch von Grundwörtern mit oder ohne Flexionsendung charakterisieren ließ (einem unsuffigierten Grundwort konnte jede beliebige Funktion zugeordnet werden, in lokaler Funktion konnten sich Suffixlosigkeit und die Flexionsendung *-n*, in temporaler Funktion Suffixlosigkeit und das Flexiv *-t* abwechseln), konnte *által* ab der zweiten Hälfte des 18. Jh. mit einem unsuffigierten Grundwort nur noch in instrumentaler Funktion stehen. Die Kurzform hatte auch als Postposition zunächst die Form *ált* und war im 16–18. Jh. wohl äußerst selten. Ihr erster bislang bekannter Beleg zeugt von temporaler Funktion: 1519: „melly collecta mynd *eztendew alth* mondatyk“ (LányiK. 162) 'welches Kollektengebet im ganzen Jahr gesprochen wird'. Es ist auffällig, dass die Variante *át* in der Rolle einer Postposition auch in dem reichen Material des SzT. aus dem 19. Jh. nicht belegbar ist. Obwohl diese Postposition in den herangezogenen literarischen Quellen in einer abstrakteren Funktion sehr häufig vorkommt, nimmt sie keine lokale oder temporale Funktion an. Eine begründete Schlussfolgerung ist daher nur anhand des Petőfi-Wörterbuches möglich: nach ihm kommen die Varianten *által* und *át* in den 1840-er Jahren in lokaler und temporaler Funktion abwechselnd vor, wobei *át* bereits stärker vertreten ist (*át*: 18 lokale, 9 temporale Belege; *által*: 4 lokale, 2 temporale Belege). Obwohl hier noch weitere sprachgeschichtliche Belege herangezogen werden müssten, kann anhand des Gesagten mit einiger Gewissheit so viel gefolgert werden, dass sich die formale Spaltung der Postposition nach der Verteilung der Funktionen kaum eher als im 19. Jh. abgespielt hat und somit ungefähr auf dieselbe Zeit wie der Formwechsel der präfigalen Varianten fiel. Es ist auch sehr wahrscheinlich, dass die zwischen ihnen bestehende formale und gewisse funktionale Analogie die Herauskristallisierung der Verteilung der Formvarianten gegenseitig begünstigt hat.

Für den funktionellen und semantischen Bereich des Präfixes ist charakteristisch, dass die große Mehrheit der Verben mit *által*, später mit *át* einen lokalen bzw. temporalen Bezug haben, und nur ein sehr viel kleinerer Anteil dieser Verben übertragene Bedeutung haben kann. Die Stabilisierung der Variante *át* als Präfix kann in zweierlei Richtungen gewirkt haben: zum Einen erfolgte die vollständige Verdrängung der präfigalen Variante *által* aus der geschriebenen, später auch aus der gesprochenen Standardsprache. Zum Anderen wurden die verschiedenen postpositionalen Varianten zu formalen Mitteln diverser grammatischer Funktionen gemacht. Da *át* als Präfix in erster Linie die Richtung oder Zeit einer Tätigkeit oder eines Geschehens bezeichnete, behielt es auch als Postposition dieselbe Variante zum Ausdruck der lokalen und temporalen Funktion bei.

Dass die konkretere Funktion mit *át*, die abstraktere mit *által* assoziiert wurde, kann durch einen weiteren systemischen Zusammenhang begünstigt worden sein: durch *által* in der Agens-Rolle mit der Bedeutung 'mit Hilfe, unter Mitwirkung' sowie durch adverbiale Ableitungen, z. B. *általjában* ~ *átaljában* 'im Ganzen' (NySz., SzT.), *általában* 'zugleich', altung. *átalján* ~ *általán* 'im Allgemeinen', *általánfogva* ~ *általánfogván* 'durchaus (nicht), im Allgemeinen' (NySz., SzT.), *általánvéggel* 'ganz gewiss', *általképpen* 'im Allgemeinen' (NySz.), die ebenfalls eine abstrakte Funktion annahmen bzw. annehmen. Die eher konkrete Bedeutung hat sich im Falle der längeren Formvariante in der Literatursprache von der grammatischen auf die lexikalische Ebene verlagert: sie lebt in Komposita wie *általút* 'Querweg', *általvető* 'Gewand zum Umhängen' weiter.

Die Geschichte der mit den Postpositionen in engem Zusammenhang stehenden Präfixe — wie z. B. *által* ~ *át* — beweist, dass ihr Wandel über ihre Entstehungsgeschichte hinaus auch später durch die bestehenden formal-funktionalen Zusammenhänge gesteuert wird.

**4.** Anhand der Veränderungen im Bereich der Formen des temporalen Gebrauchs *mind* 'ganz; alle' kann die Wirkung von Systembeziehungen zwischen mehreren Elementen eines Teilsystems beobachtet werden, insbesondere in der Geschichte des Adverbienpaars *mindé(l)tig* 'immer' und *mindig* 'ds.'. Zwischen diesen beiden Adverbien hat in den letzten Jahrhunderten der ungarischen Sprachgeschichte eine so enge synchrone Beziehung bestanden, dass sie zeitweise sogar als identisch angesehen wurden (vgl. in CzF. die Wörterbuchartikel *mindétig, mindéltig, mindig*), und in der früheren etymologischen Literatur wurde *mindig* ebenfalls aus *mindéltig* hergeleitet (Simonyi 1888–1892, 357; Horger 1937, 247–249; Beke 1947, 72; SzófSz.). Das TESz. hält dies jedoch für unwahrscheinlich, nach ihm ist *mindig* eine erstarrte suffigierte Ableitung aus *mind* 'alle; ganz'.

Die Ursachenkette, die zur zeitweisen Identifizierung der beiden Adverbien und später zur schnellen Verbreitung von *mindig* gegenüber *mindé(l)tig* geführt hat, ergibt sich aus den morphologischen und funktional-semantischen Beziehungen zwischen *mindé(l)tig* und *mindig* untereinander sowie aus ihren Beziehungen zu den ihnen am nächsten stehenden Elementen des Adverbiensystems, insbesondere zu *mind.*

*Mindéltig* entstand am Anfang der späten altungarischen Zeit, als sich sehr viele zusammengesetzte temporale Adverbien bildeten, besonders häufig unter ihnen waren Verbindungen mit dem Bestimmungswort *mind* (TNyt. II/1, 615, 626, 648). Morphologisch-syntaktisch betrachtet wird die primäre Formvariante *mindéltig* aus einem subordinierenden Kompositum zu einem lexikalisierten Adverb, und zwar aus der vorausgehenden Struktur *mind éltig*, die dem derzeit bereits vorhandenen komplexen Wortarten- und semantischen Charakter von *mind* nach (Hámori 1957, 142–47) vermutlich die Bedeutung 'sein ganzes Leben lang', 'ganz bis zum Ende/Schwund seines Lebens', 'in seinem Leben ständig andauernd' hatte.

Zusätzlich zu der ursprünglichen Form *mindéltig* entstand durch die Elision von /l/ die Variante *mindétig.* (Ihr erstes sicheres Vorkommen ist 1659 SzT. Die im TESz. angegebene Form vom Anfang des 16. Jh. ist aufgrund eines Schreibfehlers ungewiss.)

In der durch /l/-Elision entstandenen Formvariante wurde die Beziehung des Adverbs zum Grundwort des zweiten Bestandteils, dem Verb *él* 'leben', offenbar zunächst lockerer, später aufgehoben, so dass im Bestimmungswort die morphologische Struktur vollkommen verblichen ist: *mindétig* hat sich von dem suffigierten Nomen *éltig* – *éltéig* 'solange sein Leben (andauert)' abgelöst und trug somit dazu bei, dass das semantische Merkmal 'Lebensdauer' in einem Teil der adverbialen Bedeutungen wegfiel.

Die historischen Belege (vgl. dazu die Artikel *mindéltig* in NySz. bzw. SzT.) weisen das Vorhandensein folgender Bedeutungen im 16. Jh. nach. 1. 'ganz bis zum Ende seines Lebens', 2. 'in seinem Leben andauernd', 3. 'zu jeder Zeit', 4. 'in jedem Fall', 5. 'immer, dauernd'.

Während des 17–19. Jh. bestehen die Bedeutungen bezüglich der Lebensdauer (1–2) zwar fort, die andere Bedeutungsgruppe (3–5) jedoch, die das semantische Merkmal des Lebens nicht beinhaltet — die durch Bedeutungserweiterung gebildeten 'zu jeder Zeit' und 'in jedem Fall' bzw. die Bedeutungen 'immer, ständig, andauernd' —, wurde insgesamt dominanter. Dies wurde vermutlich dadurch verstärkt, dass die Bedeutungen 1–2 durch die morphologische Verdunkelung weiter geschwächt wurden. Trotzdem sind in diesen und in allen anderen Bedeutungen das morphologisch und semantisch klar gegliederte *mindéltig* und das morphologisch und semantisch gleichermaßen undurchsichtige *mindétig* parallel vorhanden. Eine Bedeutungsteilung zwischen den Formvarianten — wie man sie erwarten würde — ist nicht eingetreten.

Es zeigt sich auch durch lexikographische Auslegungen, die ab dem 17. Jh. zur Verfügung stehen, dass die Bedeutungen 3–5 zu diesem Zeitpunkt bereits typischer sind. Beispiele: MA. Perpetuo *mind eltig, ŏrŏkke*; PP. *mind éltig* Perpetuo, Perenne; PPB. *Mind étig* Perpetuo, Perenne, immerdar, stets, immerwahrend; CzF. *Mindétig.* „Egyébiránt közönségesen *mindig* helyett használják; l. *Mindig* [Im Übrigen wird es allgemein statt *mindig* gebraucht; vgl. *Mindig*]". Demnach ist bis ins 19. Jh. im Bedeutungswandel von *mindéltig* – *mindétig* mit Beibehaltung der gesamten Bedeutungsskala die Bedeutung 'andauernd, ständig, immer' allmählich in den Vordergrund gerückt.

Das Adverb *mindig* ~ *mindég* ist wesentlich jünger als *mindé(l)tig* (erstes Vorkommen 1659 SzT., 1772 TESz.). Sein Ursprung, seine Form- und Bedeutungsgeschichte, darunter auch seine Beziehung zu *mindé(l)tig*, werden durch das reiche historische Material des SzT. erhellt (vgl. den Artikel *mindig*). Obwohl *mindig* im 17. Jh. nur durch eine einzige Quelle belegt ist, existiert es im 18. Jh. bereits in fast jeder seiner Bedeutungen als morphologisch und funktionell stabiles, eigenständiges Adverb, das zu Beginn des neuungarischen Zeitalters bereits an Raum gewonnen hat, sowohl in der Alltagssprache und in der Volkssprache als auch in der Literatursprache (Bessenyei, Kazinczy, Baróti Szabó Dávid, TESz.).

Dennoch wird *mindig* in die Wörterbücher des 18. Jh. noch nicht aufgenommen, beispielsweise kommt es in keiner einzigen Ausgabe des Wörterbuches von Pápai Páriz vor. Die Variante *mindég* erscheint zuerst in der ersten, 1800 herausgegebenen Auflage des ungarisch-deutschen Wörterbuches von József Márton, in der Bedeutung 'zu jeder Zeit, immer'. Ab diesem Zeitpunkt ist seine lexikographische Präsenz ununterbrochen. Besondere Beachtung verdient seine Aufnahme in das *Ungarisch–deutsche Taschenwörterbuch* der Ungarischen Wissenschaftlichen Gesellschaft (= Tzs., 1835, 1838), das sich die Entwicklung von Normen für den ungarischen Wortgebrauch sowie die Abgrenzung des Wortschatzes der Literatursprache zum Ziel gesetzt hat und in dieser Hinsicht als Vorläufer des CzF. angesehen werden kann (Gáldi 1957, 489).

Die historischen Belege zeugen von der Überlegenheit der Variante *mindég*, selbst gegen Mitte des 19. Jh. Die Form *mindig* ist seit den 80-er Jahren des 18. Jh. belegt (SzT.) und breitet sich allmählich in den ersten Jahrzehnten des 19. Jahrhunderts aus, parallel mit ihm taucht jedoch auch immer die Variante *mindég* auf. Auch in der Sprache der Literatur lässt sich diese Schwankung beobachten (vgl. NySz. II 840, TESz., Petőfi-Wörterbuch). Der Kampf der beiden

Formvarianten erscheint in der Praxis der Wörterbuchautoren unterschiedlich beurteilt. Das Tzs. und das CzF. erachten jedoch die Form *mindig* als geeigneter für die literatursprachliche Norm (wobei sie die größere Häufigkeit von *mindég* anerkennen).

Von den Bedeutungen *mindig* ~ *mindég* taucht als erste 'ständig, fortwährend' auf (1659, 1771), aus den letzten beiden Jahrzehnten des 18. Jh. lassen sich jedoch bereits folgende Bedeutungen nachweisen: 'jeder Zeit' (1781), 'in jedem Fall' (1782), 'die ganze Zeit' (1794).

Die Bedeutungsdifferenzierungen 'von einem vergangenen Zeitpunkt bis zur Gegenwart' (1828) bzw. 'sein ganzes Leben lang' (1815) dürften sich — in den entsprechenden Kontexten — bereits mit der Entstehung dieses Adverbs herauskristallisiert oder evtl. später aus den Bedeutungen 'zu jeder Zeit' bzw. 'die ganze Zeit' entwickelt haben. Zur Zeit lassen sie sich für die ersten Jahrzehnte des 19. Jahrhunderts belegen.

In die erste lexikographische Erläuterung — in Mártons Wörterbuch — wurde hingegen nur eine der Bedeutungen: 'immer, semper, allezeit' aufgenommen, im Tzs. wird zusätzlich die Bedeutung 'stets' angegeben. Das CzF. gibt eine allgemeine Bedeutungsbestimmung unter Zusammenfassung der Teilbedeutungen an, wobei die Bedeutung 'andauernd, ständig, die ganze Zeit' hervorgehoben wird.

Anhand seiner klaren morphologischen Struktur ist *mindig* zweifellos eine Ableitung aus *mind* durch das Flexiv *-ig/-ég*. Dies wird zuerst im TESz. verlautbart: „Erstarrte suffigierte Ableitung: sie entstand aus dem Pronomen *mind* durch das Flexiv *-ig/-ég*, vgl. *addig* 'bis dort', *meddig* 'bis wo'. Nach der Entstehung von *mindig* wurde der Gebrauch von *mind* in ähnlicher Bedeutung ... etwas eingeschränkt.“ Diese Herleitung kann in ihrer Essenz, aber nicht in ihren Details akzeptiert werden. Unserer Ansicht nach ist die Entstehung von *mindig* durch funktionale und systemische Ursachen zu erklären, die jedoch nicht mit dem Pronomen *mind*, sondern mit dem Adverb *mind* zusammenhängen. Die Entwicklung von *mind* als Wortklasse und seine semantische Entwicklung von *mind* wurde von Antónia Hámori ins Detail gehend erläutert. Demnach wissen wir, dass *mind* durch eine mehrfache Funktionsentwicklung seit ca. dem 16. Jh. zu einem temporalen Adverb in der Bedeutung 'fortwährend, dauernd, immer' geworden ist (ebda. 147). Neben der temporalen Rolle hat *mind* jedoch auch seine weiteren adverbialen Funktionen beibehalten, sie wurden durch die neuen Funktionen nicht abgelöst, sondern lebten weiterhin fort, so dass die adverbialen Rollen von *mind* ebenfalls breit gefächert waren, nicht zu sprechen von seinen weiteren: pronominalen, (paarig) konjunktionalen Verwendungen. Die im 16. Jh. bereits stark ausgeprägte enorme funktionale Belastung von *mind* machte die formale Isolierung von zumindest einer der Funktionen notwendig. *Mindig* ~ *mindég* kann also anfangs eine morphologische Variante zur Bezeichnung der temporalen Bedeutung von *mind* gewesen sein, also *mind* ~ *mindig* 'fortwährend, dauernd usw.'. Die neue morphologische Variante entwickelte sich mit dem seit dem späten Altungarischen häufigsten Deklinationssuffix der temporalen Adverbien, angestoßen durch das zu diesem Zeitpunkt stark im Ausbau befindliche System der temporalen Adverbien.

Seine Verstärkung, seine Entwicklung aus einer morphologischen Variante zu einem eigenständigen Adverb wurden durch die systemischen formalen Beziehungen begünstigt: die Adverbien mit dem Suffix *-ég/-ig* (*alig* 'kaum', *ideig* 'eine Zeitlang', *későig* 'bis spät', *félig* 'zur Hälfte', *fogytig* 'bis zum „Ausgehen", bis zum Schluss', *váltig* 'bis zum Scheiden', *vég(ezet)ig* 'bis zum Ende'), aber vor allem die Zusammensetzungen mit *mind* (*mindeddig* 'ganz bis jetzt', *mindaddig* 'ganz bis dahin', *mindmáig* 'ganz bis heute', *mindvégig* 'ganz bis zum Schluss', *mindéltig* 'in seinem ganzen Leben', *mindholtig* 'bis zum Tod'), in deren Reihe sich *mindig* auf natürliche Weise einfügen konnte. Und damit konnte seine Ablösung von seinem Ausgangswort einsetzen: vom in seiner morphologischen Struktur nicht temporalen und an anderen, nicht temporalen Funktionen ebenfalls reichen *mind*.

Das Adverb *mindig* hatte durch das vom bedeutungsreichen *mind* geerbte breite Bedeutungsfeld einen Vorsprung gegenüber anderen partiellen Synonymen, die nur ein semantisches Merkmal mit ihm gemeinsam hatten und die parallel zur Verbreitung von *mindig* ganz oder allmählich aus dem Sprachgebrauch verdrängt wurden, wie z. B. *mindenha* 'allemal/zeit', *mindenszer* 'jedesmal'.

In engster Synonymie stand das Adverb mit *mindéltig* ~ *mindétig*. Im 18–19. Jh. deckten sich ihre Bedeutungen fast vollständig, außer dem Bezug auf die Lebensdauer, die zu *mindig* ursprünglich nicht gehört hatte. Als Folge der verblichenen Morphologie geriet diese Bedeutung jedoch auch in *mindétig* in den Hintergrund, und ab dem 18. Jh. — als diese Variante die üblichere war — wurde diesem Adverb ebenfalls die Hauptbedeutung 'jeder Zeit, in jedem Fall' zuteil. Zu diesem Zeitpunkt enthielt *mindig* neben der Bedeutung 'andauernd, ständig' auch schon diese Bedeutungen. Die anfängliche partielle Synonymie der beiden Adverbien wurde somit zu einer vollständigen. Die phonologische Ähnlichkeit war ebenfalls am stärksten zwischen dem mittlerweile zur Hauptvariante gewordenen *mindétig* und dem damals noch als Hauptvariante geltenden *mindég*. Die vollständige Synonymie und die phonologische Ähnlichkeit der beiden Adverbien kann zu ihrer vollkommenen Identifizierung geführt haben. Dies lässt sich anhand der Wörterbücher aus dem 19. Jh. eindeutig bestätigen: *mindétig* und *mindig* werden als Varianten desselben Wortes betrachtet. Bei der Entwicklung der standardsprachlichen Normen wird für das „regelhaftere“ *mindig* entschieden, da es sich besser in die Reihe der deklinierten temporalen Adverbien einordnen lässt. Die Variante *mindétig* hingegen wird von der Norm ausgeschlossen und gilt mit der Expansion der Literatursprache allmählich als veraltet bzw. lebt nur noch dialektal weiter. *Mindig* hingegen wird in die Norm aufgenommen, was zur Folge hatte, dass es in einer für Adverbien ungewöhnlich kurzen Zeit Akzeptanz fand und *mindétig* verdrängte.

Gemeinsam für die dargestellten Wandelphänomene ist, dass Wirkungen aus den unterschiedlichen Sprachschichten die morphonologischen, semantischen und funktionalen Beziehungen zwischen bestimmten Elementen/Teilbereichen der Sprache so stark beeinflussen (enger oder lockerer machen), dass sie von ihrer früheren Position weggerückt werden, d. h. ihr früherer Charakter modifiziert bzw. verändert sich in eine durch derartige Beziehungen bestimmte Richtung.

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# SYNTACTIC SYNONYMY: A CASE STUDY

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## Abstract

The present paper outlines a historical change in Hungarian syntax by focusing on participial constructions and their clausal equivalents in ten different Hungarian translations of the Bible. The first part investigates the relative frequency of the relevant structures and, relying upon statistical data, it characterises the process of a shift from analytic to synthetic constructions. Then we analyse secondary semantic differences among the various structures (participial constructions, subordinate clauses and coordinate clauses) and propose that in the case of subordination the semantic relationship between the matrix sentence and the dependent clause is expressed in an explicit manner. However, if the meaning of the related participial construction is complex (combining features of temporal, causal, and instrumental relationships), a subordinate clause can express only one of these, and the other features are not represented in it. Coordination, on the other hand, especially asyndetic (conjunctionless) coordination and that involving the conjunctions *és, s* 'and', is more capable of embracing several shades of meaning. Thus, in terms of their semantic properties, coordinate clauses are more similar to participial constructions than subordinate clauses are. Finally, the paper raises some general ideas with respect to the theoretical background of this kind of shift in sentence construction. The framework of the study is what is called "traditional grammar", but it also introduces some terms of functional grammar.


## 1. Introduction

Opinions differ with respect to the possibility of capturing syntactic change in terms of general rules or tendencies. Benkő (1988, 395) emphasises the difficulties of making clear-cut statements about changes in syntactic structure: "primarily in the area of sentence construction, the fact that identical mental contents can be expressed in diverse linguistic forms may provide such ample variational possibilities and may result in such structural diversity in linguistic communication that their relationships can hardly or not at all be arranged into diachronic changes in terms of concrete historical linguistics. This is part of the reason why, compared to changes in other linguistic categories, it is a lot more difficult to reveal change relationships in historical syntax or to deduct them in an exact manner".

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Authors often refer to general problems of historical syntax, including finite corpora and the resulting accidental gaps, lack of competence, the ample possibilities of variation mentioned in the previous paragraph, etc. In spite of these difficulties, an increasing number of claims can be found in the literature about the possibility of modelling syntactic change: "We believe that while the fact of change cannot be predicted, the bounds on change can be stated. It is neither possible nor desirable that linguistic theory predict that a particular syntactic change will occur; it is both possible and desirable that a theory sanction changes that do occur and rule out those that do not, and that it characterize the mechanism(s) possible in such a shift" (Harris – Campbell 1995, 6).

The subject matter of this paper, the history of adverbial participles, is a thoroughly researched topic in Hungarian linguistics. Several studies were dedicated to examining their relative frequency, as well as some of their semantic and syntactic features in various periods of Hungarian. It is also a linguistic commonplace that adverbial participial phrases were gradually supplanted by clauses during the history of Hungarian. In this respect, this paper merely presents additional (and concordant) data about the same topic on the basis of a different corpus, the chosen segments of several Bible translations.

However, the analysis of the change serves two additional purposes as well. On the one hand, we try to reflect upon this change from a systemic point of view, i.e., trying to point out the structural characteristics of this shift: what kind of synonymous structures replaced the previously preferred ones. Besides, we also attempt to advance certain claims about the differences between these grammatically synonymous structures.

Naturally, it cannot be disregarded that both the nature (translations) and the size (two chapters from the Gospel) of the corpus may give rise to scepticism about the validity of the results. As the process of translation might leave its mark on the translated material, it could result in structures which are marginal or virtually non existent in the grammar of the target language. A further problem is that several translators used other sources beside the Vulgate, which multiplies this possibility. In addition, an analysis of two chapters in ten translations cannot be called a true representation of the given period(s). Still, we believe that both claims can be refuted to a certain extent. As the findings are in concordance with results of other studies based on larger corpora and more varied sources, the hazards of such a limited corpus can be at least alleviated. By way of compensation, this limited corpus offers the opportunity of a (hopefully) more detailed case study.

The first part of the paper contains a summary of earlier studies concentrating on synchronic and diachronic characteristics of the adverbial participle. Afterwards, statistical data will be presented on the assumed shift. Subsequently, the general idea of syntactic synonymy will be introduced, with respect to its possible role in syntactic change. Then the data will be analysed in terms of syntactic synonymy, and finally a possible model of this kind of shift will be sketched.

## 2. Characteristics of the adverbial participle

### 2.1. Synchronic description

*-vA* and *-vÁn* suffixed adverbial participles occupy an intermediate position between verbs and adverbs: they have a verbal meaning specifying circumstances of another action, event, object or person, e.g.,

(1) (a) Mat. 5, 1
KNV[1] A tömeg-et lát-va fel-ment a hegy-re.
the mass-acc see-VA pv-went the mountain-sublat
KJB And seeing the multitudes, he went up into a mountain.

(b) Mat. 26, 40
KNV Ezután oda-ment a tanítványok-hoz, és al-va találta ők-et.
Then pv-went the disciple-allat and sleep-VA found they-acc
KJB And he cometh unto the disciples, and findeth them asleep.

The adverbial participle functions in the sentence most often as an adverbial of time, state, cause, or sporadically as an adverbial of purpose. However, it is characteristic of this adverbial participle that its meaning is often complex, frequently combining the features of time, cause and state, and there are several other possible combinations, most often referring to manner, but also to instrument, degree or purpose. Besides, the adverbial participle preserves all its verbal arguments in an adverbial role as well. It also distinguishes the adverbial participle from other non-finite verbs that the former permits an overtly specified subject:

(2) Mat. 22, 25
KNV és nem lé-vén utód-a, ráhagyta a feleség-é-t a testvér-é-re
and not be-VÁn offspring-poss.3sg, left the wife-poss.3sg-acc the brother-poss.3sg-sublat
KJB and, having no issue, left his wife unto his brother

[1] 'KNV' stands for *Káldi-Neovulgáta*, a translation published in 1997; 'KJB' is the abbreviation of the *King James Bible*. For further characterization of the translations, see **3**.

A further attribute of this participle is that it has twofold temporal reference. On the one hand, it preserves the imperfective or perfective aspect of the verb it is derived from, thus indicating the procession of the action/event. On the other hand, it also expresses a relationship with its head, the finite verb: these adverbials can be antecedent, simultaneous or consequent. However, these two types of temporal reference are in correlation: imperfective adverbials are most often simultaneous, whereas perfective adverbials are usually antecedent.

(3) (a) Mark 7, 30
KNV a kislány-t az ágy-on fek-ve találta (imperf. aspect, simultaneous verb)
the girl-acc the bed-superess lay-VA found
KJB she found... her daughter laid upon the bed

(b) Mat. 2, 23
KNV Oda-ér-ve egy Názáret-nek nevezett város-ban telepedett le.
get-VA an Nazareth-dat named city-iness dwelt pv
(perf. asp., antecedent verb)
KJB And he came and dwelt in a city called Nazareth:

## 2.2. Characteristics of adverbial participles: a diachronic survey

Both of the suffixes of the adverbial participle go back to the Proto-Ugric period and, according to A. Jászó (1991, 319–21, 344–9), the *-vA* form is more frequent in Early Old Hungarian, thus she assumes that this is the more ancient one. This assumption is further supported by the shorter form of the suffix and by the fact that there are certain postpositions which were originally verbs with *-vA* but became reanalysed as simple morphemes (e.g., *kezdve* 'begin-VA = from', *múlva* 'pass-VA = hence', *fogva* 'hold-VA = 1. from/since, 2. by virtue of'). During the Ancient and Old Hungarian periods several new participial suffixes emerged, including *-AttA*, *-t* (with obligatory possessive suffix and case marking), *-vAl*. However, *-AttA* can only be found in the earliest sources, and *-vAl* is dialectal in Modern Hungarian. About the syntactic role of non-finite verbs A. Jászó notes that "The abundance of non-finite verbs was a salient feature of sentence construction in Proto-Uralic and Proto-Finno-Ugric. Non-finite verbal constructions were equivalent to clauses. The main action or event of the sentence was expressed by a finite verb, and the secondary action or event by non-finite verbs" (ibid. 319).

Several studies have investigated the frequency of adverbial participles in various periods of Hungarian. Károly (1956) examined the features and frequency of nonfinite verbs in the earliest codices, JókK., BécsiK. and MünchK, and several other sources. He noted that it was a common feature of these three codices that they were rich in nonfinite verbs (he collected 6000 tokens in these three manuscripts). Concerning the distribution of the two rival suffixes of the adverbial participle, Károly observed that *-vA* forms were unusual in the earliest codices, and they did not become significantly more frequent in his later Old Hungarian sources, either. When they occurred, their use was restricted compared to that of *-vÁn* participles, as they were mostly found either as adverbials of state or manner, or as grammaticalized parts of postpositions, whereas *-vÁn* was frequent in various adverbial roles.

Horváth (1991) examined *-vA* and *-vÁn* forms by comparing data from diverse types of sources of three successive periods (1. 1570–1615; 2. 1670–1715; 3. 1825–1850). His inquiry focused (among other things) on the relative frequency of the adverbial participles, and their adverbial role in the sentence. His statistics showed that adverbial participles were almost equally frequent in the three periods, however, in the first two the *-vÁn* form was predominant, whereas the third displayed a majority of *-vA* forms. In the first two periods *-vÁn* was frequent in various types of adverbials (time, cause, state, manner etc.) except for a special subtype, the construction copula + verb-*vA*, where the *-vA*-form prevailed. This position became the most frequent site of occurrence of adverbial participles by the third period; this partly accounted for the fact that the shorter suffix became more frequent by that period. Besides, the *-vA*-form superseded the *-vÁn*-form also in the role of adverb of manner or state by the third period, whereas *-vÁn* dominantly occurred in the other functions (adverb of time, cause or various combined features), so a certain functional split could be observed between the two suffixes.

Horváth (1992, 33–81) examined the contemporary situation of adverbial participles. His data show that among adverbial participles the distribution of *-vA* is 95.27%, compared to 4.73% of *-vÁn*-forms. The most frequent position of adverbial participles is the above mentioned copula + verb-*vA* construction, besides, adverbials of state and manner are the dominant roles. Participles formed with *-vÁn* mostly occur as adverbials of time or cause.

## 3. The method of the analysis

As mentioned before, the basis of this case study was two chapters (26 and 27) from the Gospel according to Matthew in ten different translations of the Bible. Three out of the ten represent the Old Hungarian period, the Munich-codex (1466), the Döbrentei-codex (1508) and the Jordánszky-codex

(1516–1519). Four translations fall in what is termed as Middle Hungarian,[2] that of Gábor Pesti (1536), János Sylvester (1541), Gáspár Károlyi (1590) and György Káldi (1626). Modern Hungarian is represented by three translations, a translation of Szent István Társulat (1976) [Saint Steven Society, henceforward Kat.], a translation of the Magyarországi Egyházak Ökumenikus Tanácsának Ószövetségi és Újszövetségi Bibliafordító Szakbizottsága [Committee of the Oecumenical Council of Hungarian Congregations for Translating the Old and New Testament] from 1975 (henceforward Prot.) and a translation of the Szent Jeromos Bibliatársulat [Saint Jerome Bible Society], which was published in 1997, and whose translators name their work Káldi-Neovulgáta (henceforward KNV), since they relied on the translation of Káldi.

The first step in the investigation was the structural analysis of the verses of each translation (assigning sentence and clause boundaries, construing the logico-semantic relationship between the clauses). The data were assorted on the basis of the Vulgate (i.e., on the basis of the Latin structures that were translated into Hungarian with adverbial participles, or with a corresponding clausal structure). This method is evidently questionable, as not all translations were based solely on the Vulgate, still, this seemed to be the best solution. The adverbial meaning of these participial constructions is varied to such an extent (Károly in his study cited above divided them into 57 groups, cf. Károly 1956, 160–2) that it would have been highly problematic to present the data on that basis, whereas there are only three Latin structures whose Hungarian correspondents are typically participial constructions, namely participium perfectum, participium imperfectum and ablativus absolutus. Besides, this grouping helped us to find out whether there are typical renderings of the Latin participles. The charts resulting from this analysis appear in the appendix.[3] Then a general statistical comparison followed, investigating the data in terms of frequency of participial constructions and their equivalents. Finally, a more detailed analysis took place regarding semantic differences between the synonymous constructions.

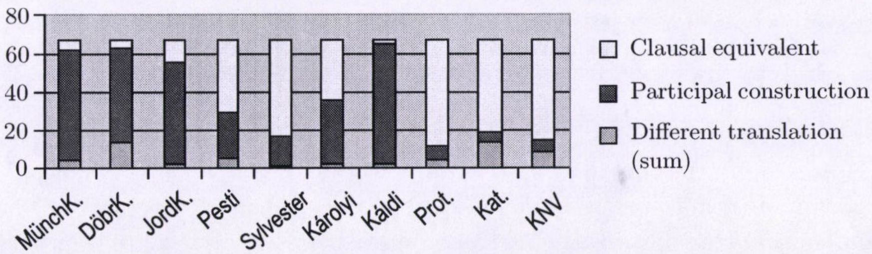
[2] The Battle of Mohács (1526) is considered to be a dividing line between Old and Middle Hungarian; on the one hand, the Turkish occupation brought about the decay of monastic culture; on the other hand, the emergence of Reformation, the spread of printing etc. created a new situation of language usage.

[3] This paper does not examine participles that occur frequently as matrix clauses of reported speech (e.g., *mondván* 'saying', *felelvén* 'responding'), as these represent a different subtype with different synonyms; for a detailed study of main clauses of reported speech in general, see Dömötör (2001, 337–69).

## 4. General statistical information

The following chart shows the statistical data of the passage in the translations. The cases in which the translation is neither a clause nor a participial structure but other constructions like a postpositional phrase or a different kind of non-finite verb will be analysed in section **5.1**.

*Fig. 1*
Frequency of participal constructions, clausal equivalents and different translations




Although it is difficult to draw the line between individual preferences of the translators and phenomena originating in the characteristics of the given period, a few general conclusions may be drawn on the basis of the statistical data. Compared to the Old and Modern periods, variety is a salient feature of Middle Hungarian, as this is the age in which the individual differences between the translations are the largest. While the Old Hungarian translations are fairly homogeneous in preserving participial structures, and Modern Hungarian translations replace them generally with clauses, Middle Hungarian translators are divided: whereas Káldi retains participial constructions, the others more or less seem to aim at replacing these with clauses. As mentioned before, the data were assorted on the basis of Latin participles in order to investigate whether the structure to be translated influences the choice of the translators. As the charts in the appendix illustrate, the temporal and structural features of the Latin participles do not seem to influence the choice of the Hungarian equivalent in this respect.

It is a characteristic feature of MünchK. that it uses two kinds of adverbial participles: one is formed with the suffix *-AttA*, the other with *-vÁn*. According to Károly (1956, 214–6), the former occurs in larger numbers only in BécsiK. and MünchK., and its meaning is more restricted than that of *-vÁn* participles: they are always simultaneous with their head, and they only occur in active constructions. A further limitation is that they seem to occur with an agent which is either the object of their verbal head or is independent of it; besides, inflection is obligatory in their case. They function as adverbials of state and/or time in the sentence:

(4) (a) Mat. 26, 40 (the agent is the object of the matrix verb)
Vulg. Et venit ad discipulos suos et invenit eos dormientes [...]
MünchK. Es iǫuǫ ǫ taneituaṅ-i-hoȝ 2 lèle ǫk-èt al-att-oc
and came he disciple-plposs.sg3-allat and found they-acc sleep-Att-poss.pl3
KJB And he cometh unto the disciples, and findeth them asleep,

(b) Mat. 26, 47 (there is no direct relationship between the matrix verb and the agent)
Vulg. Adhuc ipso loquente Iudas unus de duodecim venit
MünchK. Meg ǫ bèȝell-ètt-è im èl-iǫuǫ Iudas
while he speak-Att-poss.sg3 particle pv-came Judas
KJB And while he yet spake, lo, Judas, one of the twelve, came,

However, as charts 1 and 3 in the appendix illustrate, the distribution of Latin participium imperfectum and participium perfectum does not correlate with Hungarian *-vÁn* and *-AttA*. The only Latin-dependent choice between clausal and participial translations seems to be found with Károlyi, who used participial constructions more often when the participle was antecedent (participium perfectum), but a larger corpus might prove that this is only accidental.

The list of individual characteristics could be continued by mentioning that MünchK.[4] contains person-marked *-vA* participles (whereas this is ungrammatical in modern Hungarian, *-vA* and *-vÁn* being exclusively word final morphemes), but there is only one example of this in the material analysed, *gǫlèkeȝueiec* 'gather+vA+poss.pl3 = as they gathered') from 27,17.

It is characteristic of DöbrK. that, although generally it uses *-vÁn* participles, in quite a few cases there are examples of *-t* suffixed participles (26: 21, 40, 43, 47, 71; 27: 19, 32), which are in general similar to *-vÁn*, but these can be declined; these will also be examined in detail in **5.1**.

Among Middle Hungarian translations, Káldi's stands out with its frequent use of adverbial participles, whereas the translations of Pesti, Sylvester and Károlyi replace them to different extents. It is another common feature of these three translations that if the main clause and the dependent clause are in the same tense, then the finite verb of the dependent clause is in present conditional, whereas if the dependent clause is antecedent, then its verb is in past conditional. E.g.,

[4] And, as Károly (1956, 208) noted, these can be found in large numbers only in BécsiK. and in the Gospel according to Matthew from MünchK., from which he draws the conclusion that the first part of BécsiK. and this part of MünchK. were translated by a different person than the rest of them.

(5) (a) Mat. 26, 39 (the participle is antecedent of the matrix verb)
Vulg. Et progressus pusillum procidit in faciem suam [...]
Sylvester Es mikoroñ onnan egǵ keueſſę elębb ment vol-ua /
and when therefrom a little forward went be-cond /
arćzā-iā-ra leburula
face-poss.sg3-sublat fell
KJB And he went a little farther, and fell on his face

(b) Mat. 26, 47 (the matrix verb and the participle is simultaneous)
Vulg. Adhuc ipso loquente Iudas unus de duodecim venit
Pesti Ees meeg hogÿ Ieſus ȝola-na, Ime Iudas ... el iewe
and still that Jesus speak-cond, particle Judas ... pv came
KJB And while he yet spake, lo, Judas, one of the twelve, came,

Abaffy (1992, 170–7) explains the occurrence of conditional in the dependent clauses by an indirect influence of Latin coniunctivus, and she characterizes this phenomenon as the second stage of Latin impact, the first being when Latin clauses are translated word for word, the second when other Latin structures (such as Latin participles) are translated in this way, and the third when this kind of temporal concord occurs without an immediate Latin influence. Comparing statistics from the 15th and the 16th centuries, the frequency of the second type increases the most. This is where a correlation of changes can be attested: the accumulation of these Latin type agreements can be brought into connection with the use of adverbial participles, as Káldi and Old Hungarian translations also have the Latin-type agreement, but they prefer the adverbial participles to translate Latin participles, thus the agreement occurs more sporadically.

Modern translations are again similar to each other regarding the replacement of participles; a typical way of that is to replace participial constructions with nominal constructions (e.g., 26:8 *vacsora közben* 'during dinner', 26:21 *evés közben* 'during eating'). If preserved, participles most often occur as adverbials of state/manner (26:40, 43; 27:35, 39, 41; e.g., Kat. 26:40: *Aztán visszament tanítványaihoz, de alva találta őket* 'Then he returned to his disciplines, but found them sleeping').

## 5. Syntactic synonymy and syntactic change

Syntactic synonyms are constructions whose "semantic essence" is the same, but they differ regarding their syntactic role in the sentence and in their grammatical markers. Károly emphasises the importance of synonymy (lexical and syntactic alike) in language history as these are "rivals in the everyday routine of speaking or writing, and in many respects the history of a language is nothing but the struggle between these rivals" (Károly 1980, 45). The significance of variety and its role in syntactic change is also noted by Harris–Campbell: "One respect in which syntax differs from phonology and morphology is that syntactic patterns allow for far greater creativity. We suggest that isolated creative, exploratory expressions are made constantly by speakers of all ages. Such expressions may be developed for emphasis, for stylistic or pragmatic reasons (to facilitate communication as in changes to avoid ambiguity or to foster easier identification of discourse roles), or they may result from production errors. The vast majority of such expressions are never repeated, but a few 'catch on'" (1995, 54).

Kiss characterizes the opposition between the variant syntactic synonyms as "a difference in the presentation of the referential content, secondary semantic difference, presentational opposition" (1993, 115). He distinguishes four types of syntactic synonymy on the basis of two criteria: 1. whether the structural difference changes the hierarchical construction of the sentence or it influences topic–focus structure; 2. whether whole sentences are synonymous (global synonymy) or only constituents (local synonymy). Constructions with non-finite verbs are included in the group of local synonyms, and within that in a subgroup of constructions which differ in their hierarchical structure. After this, he points out that nominal phrases and phrases with a non-finite verb differ from clausal synonyms in the following way: "predicative and nominal structures actually differ in the extent of their explicability" (ibid. 117). Making use of these aspects, we will first compare the participles with their non-clausal, and then with their clausal equivalents.

## 5.1. Participles and non-clausal equivalents

Non-clausal equivalents can be frequently found in DöbrK., which codex prefers to use a *-t* suffixed participle, which is close to the *-vA* participle, but is declinable, e.g., 26,21 *v́ ettekben* 'he eat-t-poss.pl3-iness = as they were eating', 26,40 *alattokban* 'sleep-t-poss.pl3-iness = as they were sleeping', 27,32 *ki mentekben* 'prefix go-t-poss.pl3-iness = as they were going out'. Another possible non-clausal equivalent of the participial construction is the postpositional phrase. The modern Catholic translations (Kat., KNV) contain some examples of this, as *vacsora közben* 'dinner during = during dinner' instead of *vacsorálván* (*cenantibus*) in 26,26. Furthermore, the participle or participial construction can be simplified by translating it with a simple adverb, a finite verb or a noun:

(6) (a) Mat. 27, 1 (substitution with adverb)
MünchK. reggel lé-vén 'morning be-VÁn = being morning'
Károlyi reggel 'morning = in the morning'

(b) Mat. 27, 35 (substitution with a noun)
Kat. KNV sors-ot vet-ve 'fate-acc throw-VA = by drawing lot'
Prot. sorsvet-és-sel 'lot.draw-der-ins'

(c) Mat. 27, 41 (substitution with a single finite verb)
Prot. gúnyolód-va mond-ták 'mock-VA said-pl3 = said mockingly'
Kat. Gúnyolód-tak 'mocked-pl3 = they mocked'

As mentioned above, Kiss discusses non-finite verbal and other nominal constructions together, and his statement about these structures being less explicable than their clausal equivalents refers to both (e.g., *Látom jönni* 'I see him arriving' ~ *Látom jövetelét* 'I see his arrival' vs. *Látom, hogy jön* 'I see that he arrives'). In this respect, however, structures with adverbial participles behave significantly differently from other non-finite or nominal structures, as adverbial participles can have as many complements and adjuncts as a finite verb can. Nevertheless, these nominalized phrases (as by 'nominalization' Kiss means the transformation of dependent clauses to nominal phrases, through a possible phase with non-finite verb as head) are sparse in the translations compared to clausal equivalents.[5]

## 5.2. Participles and clausal equivalents

Károly (op.cit.) mentions that there are theories which establish a certain communicative hierarchy between the synonymous forms on the basis of their structure. According to this, analytic structures are prior to synthetic ones, and the more analytic structures can be considered as bases of transforming more synthetic ones (two independent clauses → coordinate clauses → subordinate clauses → embedded phrases). Nevertheless, Károly himself acknowledges that historical syntax cannot use such a speculative derivation unless it is proved

[5] A further subtype of non-clausal equivalents is the rendering of Latin participium imperfectum with Hungarian imperfective participle, e.g., 27,37 *praeteruntes – múl-ó-k* 'pass-ó-pl = leaving ones'. This kind of substitution is general (and natural): the Latin participle could not be translated by adverbial participles, as these are subjects of the sentence in Latin, which position the Hungarian adverbial participle can never take.

by historical data; yet he adds that at an early stage of research one can hypothesize this general communicational derivation line, which the results of the research might or might not contradict.[6]

Kiss (op.cit.) does not investigate the secondary semantic differences between synonymous coordinate and subordinate clauses. Still, on the basis of his principles, this opposition would belong to the group where the hierarchy of the whole of the sentence is influenced. As it was mentioned before, participial vs. clausal constructions contrast in the local hierarchical structure, and here explicability is the contrastive feature.

The following two figures illustrate a significant difference between periods and translators regarding the use of synonymous clauses: the first contains coordinate clauses, subordinate clauses and participial constructions, the second only subordination and coordination.

*Fig. 2*
Scale of coordinate and subordinate clauses vs. participial construction

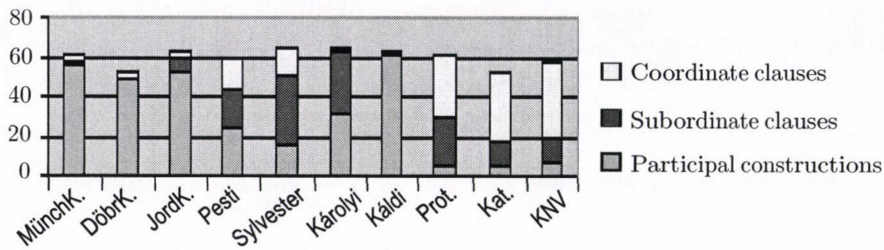
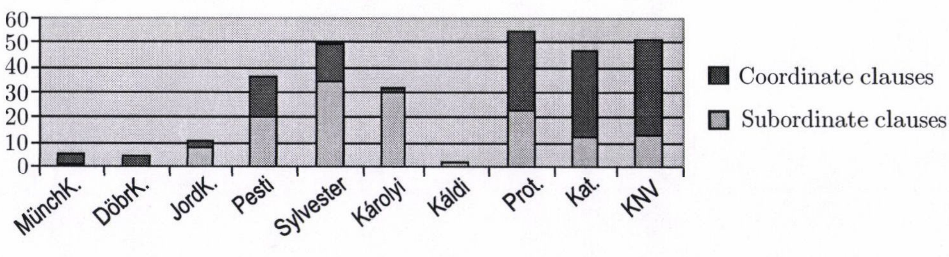



*Fig. 3*
Subordination vs. coordination




[6] The general validity of this "Paratactic Hypothesis" is debated (cf. Harris – Campbell 1995, 282–313).

In addition to the change summarized above, this chart reflects a further shift concerning synonymous clauses. Whereas Old Hungarian translations can be characterized by the dominance of participial constructions, it is a common feature of the translations of Sylvester and Károlyi that subordinate clauses prevail among the clausal synonyms. Modern translations show a further extension of this, i.e., an increase of coordinate (*and*-) clauses at the expense of both subordinate clauses and participial constructions. The change in the relative frequency of the synonymous structures shows the reverse of Károly's hierarchy: embedded phrases → subordinate clauses → coordinate clauses. Naturally, it is also plausible that there is no transition from subordinate to coordinate constructions, as in this case these data cannot be supported with the results of other studies, whereas these were available when contrasting them with participial constructions. Moreover, there are observations about the general predominance of coordinate structures in spoken language, and the modern translations might have only approached the spoken standard. Disregarding the diachronic problems in this respect, it can be still intriguing to compare subordinate and coordinate constructions.

To recapitulate, the data so far showed a shift in sentence construction from the synthetic (participial) to the analytic (clausal) type. In the following sections we will point out certain potential semantic differences between these constructions, partly to propose a possible secondary semantic difference between synonymous subordinate and coordinate constructions, and partly to modify the above mentioned communicational hierarchy.

## 5.3. A detailed analysis of the three synonymous structures

The following three sentences are different translations of Mat. 27, 28.

(7) Vulg. Et exuentes eum, chlamydem coccineam circumdederunt ei

(a) ꝛ le vetkeʒ́tet-uē ọ́t-et vè2es palaſt-al kọ́2ṅekeʒe-c meg ọ́t-èt (MünchK.)
and pv undress-vÁn he-acc scarlet robe-instr put-pl.3 pv he-acc

(b) ees mÿkoron le wetkeʒtet-tek wol-na ew-tet ada-nak reÿaÿa barſon
and when pv undressed-pl.3 be-cond he-acc gave-pl.3 he-sublat velvet
rwha-t, (Pesti)
garment-acc

(c) Levetkőztet-ték ő-t, vörös katonaköpeny-t ad-tak rá, (KNV)
undressed-pl.3 he-acc, scarlet greatcoat-acc gave-pl.3 he-sublat

KJB And they stripped him, and put on him a scarlet robe.

The participle phrase in sentence (7a) is an adverbial of time. Although the original in Latin is a participium imperfectum (*exuentes*), the perfective stem of the Hungarian participle and the meaning of the sentence suggest that the participle is antecedent. This is further supported by (7b), where the Latin-type agreement in Pesti's translation also suggests an antecedent relationship; the dependent clause enhances[7] the meaning of the main clause with temporal reference. Sentence (7c) contains a coordinate clause as the equivalent of the Latin participle phrase. By the help of their perfective verbs, these two clauses also express temporal succession. Thus all these synonymous clause complexes contain temporal enhancement, but the reference to time is more explicit in the subordinate clause than in the non-finite and the coordinate constructions.

The relationship between the following sentences (Mat. 26, 8) is similar to some extent:

(8) Vulg. sciens autem Iesus ait illis

(a) Tud-uā ke· i$^{c}$ mōda aȝoc-nac. (MünchK.)
know-vÁn yet Jesus said those-dat

(b) Amikor Jézus észrevette, ez-t mondta nekik. (Prot.)
when Jesus noticed, this-acc said them

(c) Jézus észrevette, s így szólt hozzájuk. (Kat.)
Jesus noticed, and thus said them

KJB When Jesus understood it, he said unto them

Analysing first sentence (8b), the equivalent of the Latin participle *sciens* is again a temporal clause. However, the semantic relationships within the clause complex and its context would allow a further type of enhancement, i.e., causal. Both these components are present in the meaning of the participle in sentence (8a). (Complexity is a characteristic feature of participles, and a time cause combination is typical among the occurring combinations.) Sentence (8c) contains coordinate clauses. Similarly to (7c), the second clause can be interpreted as expressing temporal enhancement, the two perfective verbs themselves establishing temporal succession. Moreover, it can also be interpreted as causal enhancement for the very same reason (Jesus noticed and [then / so] he said). So among these sentences, participial constructions are more similar to coordination than to subordination: whereas the semantic relationship between the main and the dependent clause is marked explicitly, the structures with a

[7] Enhancement as a term is used here in the following sense: "In ENHANCEMENT one clause enhances the meaning of another by qualifying it in one of a number of possible ways: by reference to time, place, manner, cause or condition" (Halliday 1985, 211).

participial construction or a coordinate clause are less specifically marked in this respect, therefore they can contain various shades of meaning.

It is also informative to compare the following sentences (Mat. 27, 4):

(9) Vulg. Peccavi, tradens sanguinem justum.
(a) Bủnhọtt-èm aʒ a2tatlā vė2-t èl-a2ol-uan. (MünchK.)
sinn-sg1 the innocent blood-acc pv-betray-vÁn
(b) Vitkezt-em hoǵ elarult-am az ārtatlan vir-t. (Sylvester)
sinn-sg1 that pv-betrayed-sg1 the innocent blood-acc
(c) Vétkezt-em, mert ártatlan vér-t árult-am el. (Prot.)
sinn-sg1 because innocent blood-acc betrayed-sg1 pv
(d) Vétkezt-em, el-árult-am az igaz vér-t. (KNV)
sinn-sg1, pv-betrayed-sg1 the innocent blood-acc
KJB I have sinned in that I have betrayed the innocent blood.

The meaning of the participle in sentence (9a) is again complex: it contains temporal, causal and manner enhancement simultaneously (*bünhödtem, amikor elárultam; bünhödtem, mert elárultam; bünhödtem azáltal, hogy elárultam*[8] = I sinned [when / as ] I betrayed / [by] betraying). The subordinate enhancement in sentence (9b) refers only to means, whereas that in (9c) to cause. In sentence (9d), the first clause of the coordinate complex is elaborated on by the second. Verse 26, 12 contains an enlightening example of the semantic difference between subordinate clauses and participial constructions.

(10) Vulg. Mittens enim haec unguentum hoc in corpus meum ad sepeliendum me fecit.
(a) Me2t è2èʒt-ettè è kènèt-et èn teſt-em-re èl-tèmèt-èndọ́-nèc
because pour-AttA this chrism-acc I body-poss.sg1-sublat pv-bury-part.inst-dat
tọ́t èngemèt (MünchK.)
did me
(b) Mert ez · az kenet-et en test-em-be boLat-van · engem
because this that chrism-acc I body-poss.sg1-lat pour-vÁn me
temetes-re tọ́tte (DöbrK., 216r)
burial-sublat did
(c) mert e kenet-et kÿt eʒ aʒonÿallat een teſt-em-re
because this chrism-acc who-acc this woman I body-poss.sg1-sublat
bochata, teue eʒ-t aʒ een temeteſ-em-re (Pesti)
poured, did this-acc the I burial-poss.sg1-sublat
(d) Mert hoǵ ez kenet-et ez aſßoṅiallat az en teſtem-re
because that this chrism-acc this woman the I body-poss.sg1-sublat
boczāta / ez-t az en eltemeteſ-em-re tiuę. (Sylvester)
poured this-acc the I burial-poss.sg1-sublat did

[8] Károly categorizes the participle of this structure as an adverbial of manner expressing dual-aspect action (Károly 1956, 159).

(e) Mert amikor ez-t a kenet-et test-em-re
because when this-acc the chrism-acc body-poss.sg1-sublat
öntötte, temetés-em-re készített elő. (Prot.)
poured, burial-poss.sg1-sublat prepared pv

(f) Amikor ő ki-öntötte ez-t a kenet-et a test-em-re,
when she pv-poured this-acc the chrism-acc the body-poss.sg1-sublat,
a temetés-em-re tette. (KNV)
the burial-poss.sg1-sublat did

KJB For in that she hath poured this ointment on my body, she did it for my burial.

Here (10a) contains an *-AttA* suffixed participle, which is an overt marker of simultaneity of the finite and the non-finite verb. Therefore, on the one hand, it can be analysed as an adverbial of time (when she poured, she prepared). On the other hand, it also refers to means (through pouring she prepared). (10b) also contains a participial construction with similarly complex meaning, although the exact nature of temporal relationship with its head is not marked with a specialized derivative suffix.

The clausal synonyms seem to "struggle" to convey this dual meaning. (10c) and (10d) try to disambiguate syntactic and semantic relationships by inserting deictic demonstrative pronouns. The attributive clause of (10c) contains neither the temporal nor the manner component. (10d) contains the marker of a subordinate relationship, *hogy* 'that', which may bind a subject clause; however, neither these subordinate complexes yield a palpable analysis. Modern translations (10e,f) only express the time component with temporal clauses.[9]

We are aware of the fact that these secondary semantic differences are not tangible and therefore it is difficult to describe or define them. They behave more or less similarly to conventional implicatures. Kiefer introduces these by comparing (among others) the following two sentences.

(11) (a) The girl is poor and honest.
(b) The girl is poor but honest.

He assigns the presence of implicature to 'but'. The exact nature of this implicature (whether *but* implicates that it is suprising that someone is poor and still honest, or it alludes to the claim that the girl is poor, which is a disadvantage, but she is honest, which is an advantage) cannot be established: *but* instead of *and* implicates a certain type of contrast. He concludes as follows: "Conven-

[9] *Mert* 'because' establishes causal relationship with the preceding sentence (and not between the clauses) in this case.

tional implicatures are the weakest among semantic consequence-relationships [...] Although conventional implicature is bound to linguistic substance, usually its exact content cannot be formulated" (Kiefer 2000, 30).

We wish to propose that the semantic relationship between the synonymous clauses compared above is parallel with conventional implicatures. Temporal relationship inherently combines with other types of enhancement in all the three types of synonymous structures, as they all contain verbs with certain temporal marking. The difference between these structures is that the adverbial participle is capable of embracing several types of enhancement: besides temporal, it can also express causal, manner and several other references. Out of these types (including temporal) subordinate clause complexes express only one, but they express that in an explicit way by virtue of their conjunction. On the other hand, asyndetic coordinate clauses, and clauses with the conjunction *és, s* 'and'[10] can also express several types of logico-semantic relationship simultaneously, similarly to participial constructions. These functional differences cannot be formulated as rules just as conventional implicatures cannot, but they exist as much as conventional implicatures do.

## 6. Modelling the shift from synthetic to analytic constructions

Before discussing the possibilities of constructing a model, one has to consider whether it is appropriate to speak about a change here. To quote Harris and Campbell again: "Only when the expression is used in additional contexts and is generalized [...] may we speak of a grammatical change having taken place" (1995, 54). In this sense, one cannot speak about a change in this case, as participial and clausal constructions are not in a source–innovation relationship: both are present in Modern Hungarian grammar, and they were both parts already of the grammar of Old Hungarian. However, there seems to be a regular relationship between the synonymous subordinate, coordinate and participial patterns, and the shift from participial to clausal constructions has been attested in several languages (this topic is discussed for Finnish by Hakulinen (1971), for Khanty by Csepregi (1983), and by Herman (1967) for Old French). As for the function of adverbial participles in Modern Hungarian, one can say that in those adverbial roles in which adverbial participles have become infrequent they behave similarly to "exploratory constructions", which

[10] As *és* 'and' can appear as a conjunction of positive, negative and adversative addition as well as temporal and causal enhancement.

Harris and Campbell characterize as ones that "may be judged ungrammatical, stylistically odd, or foreign, but will nevertheless be understood. Under appropriate circumstances a native speaker might use them as a poetic expression, as a periphrasis motivated by the desperation of not finding a more appropriate means of expression, as a way of deliberately producing stylistic oddity or foreign flavour, or for other stylistic reasons or communicative needs. From our point of view, exploratory expressions are important because they sometimes become part of a grammar" (1995, 54).

Participial constructions with *-vÁn* (and also *-vA* in the above mentioned roles)[11] are in principle available in the grammar of Modern Hungarian, but whenever used, they are strongly marked stylistically (archaic, elaborate), and native speakers do not judge them unanimously grammatical. As mentioned before, the *-vÁn* form of the suffix is quite rare in Modern Hungarian. Considering these, we can agree with Haader (2001, 368) in that "the operation of syntactic synonymy has brought about slow, not extinctive (displacing), but coexisting changes in the system of complex sentences, resulting in a shift in proportions."[12] Having thus argued that this shift should be considered as a change, in the following paragraphs we will address the problems of modelling the change.

According to A. Jászó (1991, 321), the oldest Hungarian non-finite verbs show a bipartition in their development: on the one hand, they were reanalysed as finite verbs and thus integrated into the conjugation paradigm (the past tense marker *-t* derives from the ending of the perfective participle). On the other hand, they were embedded into the sentence as non-finite phrases. The adverbial participle could have developed in either direction. According to Károly, in MünchK. and BécsiK. there are numerous examples of inflected adverbial participles. He notes that there is apparently no functional difference between inflected and non-inflected participles, but via inflection the adverbial participle approaches the category of finite verbs. Furthermore, he adds that marking the agent even on non-finite verbs is characteristic of Uralic languages; this feature is so different from the Latin original that it especially emphasises

[11] Károly claims that the syntactic independence of the adverbial participle in the role of adverb of time or cause is stronger than in the role of adverb of condition or manner. He also points out that modern Hungarian prefers to replace the former two types with clauses, which can be explained by this greater independence (Károly 1956, 198).

[12] Parallel cases can be found in other areas of historical development. For instance, Kiparsky notes that "in phonemic terms the Great Vowel Shift of English caused a major restructuring of the English vowel inventory; from the viewpoint of the phonological theory [...] it hardly changed it at all" (Kiparsky 1988, 390–1).

the characteristic Hungarian flavour of the translations.[13] Horváth (1991) mentions that in the first two periods examined he found more than forty cases in which adverbial participles occurred in the role of predicate, whereas in the third period there were only seven such cases. In his investigation of Modern Hungarian (Horváth 1992), however, there is only one instance of this.

There is further evidence of this possibility of participles being reanalysed as finite verbs. Velcsovné calls attention to the fact that in various periods and in the writings of several authors (codices of the 15th and 16th centuries, Bálint Balassa, Kelemen Mikes, Péter Apor), there are conjunctions between the finite verb and the adverbial participle. From this (and several other details) she concludes that in the competence of these authors an adverbial participle is equal to a third person singular finite verb in certain cases (1957, 105–10; 1981, 308–15). Examples from our segments of the Bible translations are:

(12) Mat. 27, 48
Vulg. Et continuo currens unus ex eis acceptam spongiam implevit aceto et imposuit harundini et dabat ei bibere.
MünchK. Es legottan aʒoc kǫʒʒǫ́l eg èl fut-uan / vǫn eg
and immediately those out.of one pv run-vÁn/ took one
ʒ́oua2uā-t ʒ bè-tǫ́lte aʒt èćet-tel / ʒ tė-uėn a· nad-2a
sponge-acc and pv-filled that-acc vinegar-instr / and put-vÁn the reed-sublat
ʒ aduala iṅ-ṅa nèki
and gave drink-inf-poss.sg3 him
KJB And straightway one of them ran, and took a spunge, and filled it with vinegar, and put it on a reed, and gave him to drink.

(13) Mat 26, 51
Vulg. Et ecce unus ex his, qui erant cum Iesu, extendens manum exemit gladium suum, et percutiens servum principis sacerdotum amputavit auriculam eis.
(a) DöbrK. Es ime eǵ azok kǫ́zzǫ́l · ki-k iesus-sal vala-nak ·
and particle one those out.of who-pl Jesus-comit was-pl.3
kez-et ki ńojt-van · ki hvza tǫ́-ret: es
hand-poss.sg3-acc pv stretch-vÁn pv pulled dagger-poss.sg3-acc and
vag-van pap-ok pv́spǫ́k-enek zolga-iat: es el vaga
cut-vÁn priest-pl bishop-poss.sg3-dat servant-poss.sg3-acc and pv cut
v́neki iob fv́l-et (218r)
his right ear-poss.sg3-acc

[13] The only example within the analysed chapters of MünchK. is the already mentioned *gǫlèkeʒ-ue-iec* 'gather-vA-poss.pl3 = as they gathered') from 27,17.

(b) JordK. Es yme egy azokkezzel ky-k Jeſuſ-ſal vala-nak,
and particle one those.out.of who-pl Jesus-comit was-pl.3
kez-eet nyoyth-wa ky veeve hw̃ ffegywer-eeth, es meg
hand-poss.sg3-acc stretch-VA pv took he weapon-poss.sg3-acc and pv
ſeb-het-veen az papy feyedelem-nek egy zolga-yat,
wound-der.-VÁn the sacerdotal prince-dat one servant-poss.sg3-acc
es el vaga hw̃neki ffyl-eet.
and pv cut his ear-poss.sg3-acc

KJB And, behold, one of them which were with Jesus stretched out his hand, and drew his sword, and struck a servant of the high priest's, and smote off his ear.

However, in Modern Hungarian the adverbial participle cannot be inflected, and the occurrence of a conjunction between the participle and the finite verb is ungrammatical. So one can conclude that there was a potential of reanalysis, but it was not followed by extension, so from the point of view of historical linguistics this is a deadlock.

Let us now turn to the properties of the shift as it actually happened. Harris and Campbell summarize the generally accepted trigger for syntactic change as follows: "A tension between the speaker's need for concise expressions and the hearer's need for redundancy and more elaborated expressions is often credited with causing change [...], and this is true for syntactic change, just as for phonological or morphological change" (1995, 54). Herman proposed the framework of communication theory: "there are situations in the history of a language of which it is symptomatic that the conditions of mutual understanding worsen to a certain extent, that is, the level of noise increases [...] (1967, 166). By 'level of noise' he means such factors as mass influx and assimilation of foreign speakers to a speech community; first stage of dialect mixture; great division in a society concerning education, etc. If the level of noise grows, its effect is counterbalanced by a more redundant code, which in language would mean more redundant structures. He claims that "analytic structures constructed of a larger number of words and following regular and frequent patterns are more redundant than the so called synthetic structures of the same function, which are condensed and correspond to rarer and more varied structures; the spread of analytic forms is a characteristic feature of the whole of the development of late Latin" (167). As mentioned before, a similar shift from synthetic to analytic constructions was found in Finnish (Hakulinen 1971) and in Khanty (Csepregi 1983). Both these authors mention that this change could be motivated by contact (with Swedish in the case of Finnish, and Russian in case of Khanty) and borrowing.

It is difficult to decide, though, what could have triggered the shift in Hungarian. It is generally accepted that whereas the Hungarian lexicon was strongly influenced by language contact, grammar reflects a moderate amount of direct foreign impact. Of course, contact could have served as a model, but to ascertain this would require extensive areal research. Herman's model is attractive, but the presence of the triggering factor, i.e., the increasing level of noise, is not easy to demonstrate in concrete cases. However, the phases of the shift could be hypothesized: the excessive functional load of the adverbial participle was reduced first by the functional split, and later another mechanism could have emerged, which aimed at polarizing the difference between the adverbial participle and the finite verb. This would harmonize with Károly's observation that adverbial participles are eliminated from more independent syntactic positions. Nevertheless, comparative investigations of larger sources from several periods are needed to form a true notion of the shift and the possible triggering factors. The following volume of the Historical Grammar of the Hungarian Language (investigating the Middle Hungarian period) will certainly be a mine of information in this respect, and its conclusions will be relevant for areal, typological and historical linguistics alike.

## Appendix

The following charts contain the Hungarian equivalents of the Latin participium imperfectum, participium perfectum and ablativus absolutus, respectively. If the given Hungarian translation contains an adverbial participle, then its cell contains a plus, if not, then a minus sign. Non-finite verbal constructions are further highlighted by their background being shadowed: the background of adverbial participles is darker grey, whereas the background of other non-finite verbs is lighter. The abbreviation next to the plus sign stands for the role of the participle in the sentence ($A_t$ = adverb of time, $A_m$ = adverb of manner, $A_{cause}$ = adverb of cause, $A_{st}$ = adverb of state); only the first occurrence is marked thus, though. If the cell contains a minus sign, then the function of the clause is always indicated (a. subordinate clauses: S: subject clause, $A_t$: temporal clause, $A_m$: clause of manner, $A_{means}$: clause of means, $A_{cause}$: clause of cause; b. coordinate clauses: conn. = "connected sentence", referring to various kinds of loose logico-semantic relationship between coordinate clauses, including asyndetic and *and*-clauses; circ. = circumstantial clause, contr. = contrasting clause; c. div. = the translator divides the original participle and its head into two separate sentences). If the Hungarian clause contains Latin-type temporal agreement, that is also marked (Lat. = Latin-type agreement, ant. = the adverbial participle is antecedent, sim. = the adverbial participle is simultaneous).

*Table 1: Hungarian equivalents of participium imperfectum*

| | MünchK. | DöbrK. | JordK. | Pesti | Sylvester |
|---|---|---|---|---|---|
| Chapter 26 | | | | | |
| **habens**$_{6-7}$ | +, $A_{st}$ | –, omitted | –, omitted | –, appos. comp. | –, appos. comp. |
| **videntes**$_{8}$ | +, $A_{t/cause}$ | + | + | + | –, $A_t$, Lat. ant. |
| **sciens**$_{10}$ | +, $A_{t/cause/st}$ | + | + | + | –, $A_t$, Lat. ant. |
| **mittens**$_{12}$ | +, $A_t$, *-ette* | + | + | –, attributive | –, S |
| **edentibus**$_{21}$ | –, $A_t$, Lat. sim. | *ú ettekben* | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. |
| **accipiens**$_{27}$ | –, conn | +, $A_{t/m}$ | + | + | + |
| **orans**$_{39}$ | +, $A_t$ | + | + | –, conn. | –, conn. |
| **dormientes**$_{40}$ | +, $A_{st}$, *alattoc* | *alattokban* | + | –, $A_{st}$ Lat. sim. | –, $A_{st}$ Lat. sim. |
| **dormientes**$_{43}$ | +, $A_{st}$, *alattoc* | *alattokban* | + | –, $A_{st}$ Lat. sim. | –, $A_{st}$ Lat. sim. |
| **accendens**$_{49}$ | +, $A_t$ | + | + | –, conn. | + |
| **extendens**$_{51}$ | +, $A_{m/t}$ | + | + | –, conn. | + |
| **dercutiens**$_{51}$ | +, $A_{m/t}$ | + | + | –, conn. | –, conn. |
| **tenentes**$_{57}$ | +, $A_t$ | + | + | + | –, $A_t$, Lat. ant. |
| **surgens**$_{62}$ | +, $A_t$ | + | + | + | + |
| **sedentem, venientem**$_{64}$ | +, $A_{st}$ *ùlèttè, ioụèttè* | +, *úlven, ioṇi* | +, *ylwen, yewen* | –, *iewni, iewewt* | –, $A_{st}$ |
| **exeunte**$_{71}$ | +, $A_t$, *-ette* | –, *ki mentebe* | + | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. |
| Chapter 27 | | | | | |
| **videns**$_{3}$ | +, $A_{t/cause}$ | + | –, $A_t$, Lat. ant. | + | + |
| **tradens**$_{4}$ | +, $A_{t/m/cause}$ | + | + | –, $A_{means}$ | –, $A_{means}$ |
| **abiens**$_{5}$ | +, $A_t$ | + | + | –, conn. | –, $A_t$, Lat. ant. |
| **videns**$_{24}$ | +, $A_{t/cause}$ | + | + | –, consecutive | –, $A_t$, Lat. ant. |
| **suscipientes**$_{27}$ | –, conn. | +, $A_t$ | + | –, conn. | –, conn. |
| **exeuntes**$_{28}$ | +, $A_t$ | + | + | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. |
| **plectentes**$_{29}$ | –, part.perf. as attrib. (*font*) | +, $A_t$ | + | –, conn. | –, part.perf. as attrib. (*font*) |
| **exspuentes**$_{30}$ | +, $A_t$ | + | + | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. |
| **exeuntes**$_{32}$ | +, $A_t$ | –, *ki mentekben* | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | –, $A_t$, Lat. ant. |
| **mittentes**$_{35}$ | +, $A_m$ | + | + | + | –, conn |
| **sedentes**$_{36}$ | +, $A_{st}$ | + | + | + | + |
| **praeterun-tes**$_{39}$ | –, part.imp. (*muloc*), subj. | –, part.imp. (*mvlok*), subj. | –, appositive clause | –, S | –, S |
| **moventes**$_{39}$ | +, $A_{m/st}$ | + | + | –, conn. | –, conn. |
| **illudentes**$_{41}$ | – | +, $A_m$ | – | – | + |
| **stantes**$_{47}$ | –, part.imperf. (*alloc*), $A_{part}$ | –, part.imperf. (*allok*), app. complement | –, appositive clause | –, appositive clause | –, appositive clause |
| **auditenes**$_{47}$ | +, $A_{t/cause}$ | + | –, appos. cl. | –, omitted | –, $A_t$, Lat. ant. |
| **currens**$_{48}$ | +, $A_{time}$ | + | + | –, conn. | + |
| **liberans**$_{49}$ | –, *megʒa-badeitani* | –, *el zaba-deitania* | –, *meg zaba-doytany* | –, *meg ʒaba-dÿtanÿ* | –, clause of purpose |
| **clamans**$_{50}$ | +, $A_{m/t}$ | + | + | –, conn. | –, $A_t$, Lat. ant. |
| **exeuntes**$_{53}$ | +, $A_t$ | + | + | + | –, conn. |
| **custodientes**$_{54}$ | +, $A_{cause/st}$ | –, part.imp. (*ọri-zọk*), appos. | + | –, appos. clause | –, appos. clause |
| **ministrantes**$_{55}$ | +, $A_{cause/st}$ | –, part.imp. (*zol-galok*), appos. | + | + | –, conn. |
| **sedentes**$_{61}$ | +, $A_{m/st}$ | + | + | –, non-restr. rel. clause | –, non-restr. rel. clause |
| **abeuntes**$_{66}$ | +, $A_t$ | + | + | –, conn. | –, conn. |
| **signantes**$_{66}$ | +, $A_t$ | + | + | + | –, conn. |

| KÁROLYI | KÁLDI | PROT. | KAT. | KNV |
|---|---|---|---|---|
| | | | | |
| –, appos. compl. | –, appos. compl. | –, appos. compl. | –, div. | –, div. |
| + | + | –, $A_t$ | –, *ennek láttán* | – *ennek láttán* |
| –, $A_t$, Lat. ant. | + | –, $A_t$ | –, conn. | –, conn. |
| –, S | + | –, $A_t$ | –, $A_t$ | –, $A_t$ |
| –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | –, *evés közben* | –, *vacsora közben* | –, $A_t$ |
| –, $A_t$, Lat. ant. | + | –, conn. | –, conn. | –, conn. |
| + | + | –, conn. | –, conn. | –, conn. |
| + | + | + | + | + |
| + | + | + | + | + |
| –, $A_t$, Lat. ant. | + | + | –, div. | –, div. |
| + | + | –, conn. | –, conn. | –, conn. |
| –, $A_t$, Lat. ant. | + | –, conn. | –, conn. | –, conn. |
| + | + | –, S (reorg.) | –, S (reorg.) | –, conn. |
| + | + | –, conn. | –, conn. | –, conn. |
| –, *ŭlni, el iŏni* | –, *ŭlni, el-jŏni* | –, $A_{st}$ | –, $A_{st}$ | –, *ülni, eljönni* |
| –, $A_t$, Lat. sim. | + | –, $A_t$ | –, $A_t$ | –, $A_t$ |
| | | | | |
| + | + | –, $A_t$ | –, $A_t$ | –, $A_t$ |
| –, $A_{means}$ | + | –, $A_{cause}$ | –, circ. | –, circ. |
| –, conn | + | –, conn. | –, conn. | –, conn. |
| + | + | –, $A_t$ | –, div. | + |
| –, $A_t$, Lat. ant. | + | –, conn. | –, conn. | –, conn. |
| –, $A_t$, Lat. ant. | + | –, conn. | –, conn. | –, conn. |
| –, part.perf. as attrib. (*tĺnált*) | + | –, part.perf. as attrib. (*font*) | –, conn. | –, conn |
| –, $A_t$, Lat. ant. | + | –, conn. | –, conn. | –, conn. |
| –, $A_t$, Lat. sim. | + | –, *kifelé menet* | –, $A_t$ | –, $A_t$ |
| + | + | –, *sorsvetéssel* | + | + |
| –, S | + | –, conn. | –, conn. | –, conn. |
| –, S | –, part.imperf. (*elŏ-ménŏk*), subj. | –, S | –, part. imperf. (*menők*), S | –, part. imperf. (*járók*), S |
| + | + | + | + | + |
| + | + | + | –, *gúnyolódtak* | + |
| –, appositive clause | + | –, part. imperf. (*állók*), $A_{part}$ | –, part. imperf. (*állók*), $A_{part}$ | –, part. imperf. (*állók*), $A_{part}$ |
| –, $A_t$, Lat. ant. | + | –, attrib. clause | + | –, *hallatára* |
| + | + | –, conn. | –, conn. | –, conn. |
| –, clause of purpose | +, $A_{purpose}$ | –, clause of purpose | –, clause of purpose | –, clause of purpose |
| –, $A_t$, Lat. ant. | + | –, conn. | –, conn. | –, conn. |
| + | + | –, conn. | –, conn. | –, conn. |
| + | + | –, S | –, appositive clause | –, S |
| –, conn. | + | –, conn. | –, conn. | –, conn. |
| –, non-restrictive relative clause | + | –, non-restrictive relative clause | –, conn. | –, conn. |
| + | + | –, conn. | –, conn. | –, conn. |
| + | + | –, conn. | –, conn. | –, conn. |

*Table 2*

*Hungarian equivalents of participium perfectum*

| | MünchK. | DöbrK. | JordK. | Pesti | Sylv. | Károlyi | Káldi | Prot. | Kat. | KNV |
|---|---|---|---|---|---|---|---|---|---|---|
| Chapter 26 | | | | | | | | | | |
| **contristati**$_{22}$ | –, conn. | +, $A_{t/cause}$ | + | –, conn. | + | + | + | –, conn. | –, conn. | –, conn. |
| **progressus**$_{39}$ | +, $A_t$ | –, conn. | + | –, conn. | –, $A_t$, Lat. ant. | + | + | –, conn. | –, conn. | –, conn. |
| **ingressus**$_{58}$ | +, $A_t$ | + | + | + | + | + | + | –, conn. | –, div. | –, div. |
| **egressus**$_{75}$ | +, $A_t$ | + | + | + | –, $A_t$, Lat. ant. | + | + | –, conn. | –, conn. | –, conn. |
| Chapter 27 | | | | | | | | | | |
| **vinctum**$_{2}$ | +, $A_t$ | + | + | + | + | + | + | –, conn. | –, conn. | –, conn. |
| **ductus**$_{3}$ | +, $A_{t/cause}$ | –, conn. | + | –, conn. | –, conn. | + | + | –, conn. | –, conn. | –, conn. |
| **acceptis**$_{6}$ | +, $A_t$ | + | + | + | –, conn. | + | + | –, conn. | –, contr. | –, conn. |
| **flagel-latum**$_{26}$ | +, $A_t$ | –, part. perf. as app. | + | –, part. perf. as app. | + | + | –, part. perf. as attrib. | –, conn. | –, conn. | –, conn. |
| **acceptam**$_{48}$ | –, conn. | –, conn. | –, conn. | + | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. | + | –, conn. | –, conn. | –, conn. |

*Table 3*
*Hungarian equivalents of ablativus absolutus*

| | MünchK. | DöbrK. | JordK. | Pesti | Sylvester | Károlyi | Káldi | Prot. | Kat. | KNV |
|---|---|---|---|---|---|---|---|---|---|---|
| Chapter 26 | | | | | | | | | | |
| **facto$_{20}$ (p)** | +, $A_{t/cause}$ | + | + | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. | –, $A_t$, Lat. sim. | + | –, $A_t$ | –, $A_t$ | –, $A_t$ |
| **cenantibus$_{26}$ (i)** | +, $A_{t/cause}$, *-atta* | + | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | + | –, $A_t$ | –, *vacsora közben* | –, $A_t$ |
| **dicto$_{30}$ (p)** | +, $A_t$ | + | + | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. | + | –, $A_t$ | –, conn. | –, $A_t$ |
| **adsumpto$_{37}$ (p)** | +, $A_t$ | + | –, conn. | + | + | + | + | –, conn. | –, div. | –, conn. |
| **rectis$_{44}$ (p)** | +, $A_t$ | + | + | + | + | + | + | –, conn. | –, conn. | –, conn. |
| **loquente$_{47}$ (i)** | +, $A_t$, *-ette* | –, *v́ zoltaba* | + | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | + | –, $A_t$ | –, $A_t$ | –, $A_t$ |
| **relicto$_{56}$ (p)** | +, $A_t$ | + | + | + | –, conn. | + | + | –, conn. | –, conn. | –, conn. |
| Chapter 27 | | | | | | | | | | |
| **tacto$_1$ (p)** | +, $A_t$ | + | –, $A_t$ | + | –, $A_t$ | –, *reggel* | + | –, $A_t$ | –, $A_t$ | –, $A_t$ |
| **projectis$_5$ (p)** | +, $A_t$ | + | + | + | –, conn. | + | + | –, conn. | –, conn. | –, conn. |
| **initio$_7$ (p)** | +, $A_t$ | + | + | –, div. | + | + | + | –, conn. | –, conn. | –, conn. |
| **congregatis$_{17}$ (p)** | +, $A_t$ | + | + | + | –, conn. | –, $A_t$, Lat. ant. | + | –, $A_t$ | –, omitted | –, conn. |
| **sedente$_{19}$ (i)** | +, $A_t$, *-ette* | –, *v́lteben* | + | –, $A_t$, Lat. sim. | –, $A_t$, Lat. sim. | –, $A_t$, Lat. ant. | + | –, $A_t$ | –, $A_t$ | –, $A_t$ |
| **accepta$_{24}$ (p)** | +, $A_t$ | –, conn. | –, conn. | –, conn. | –, conn. | + | + | –, conn. | –, div. | –, conn. |
| **flexo$_{29}$ (p)** | +, $A_{t/st}$ | + | + | + | + | + | + | + | –, conn. | + |
| **viso$_{54}$ (p)** | +, $A_{t/cause}$ | + | + | + | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. | + | –, $A_t$ | –, *láttára* | –, *láttán* |
| **accepto$_{59}$ (p)** | +, $A_t$ | + | + | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. | –, $A_t$, Lat. ant. | + | –, conn. | –, conn. | –, conn. |

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# MIKRODIACHRONIE UND SPRACHWANDEL IN DEN ZUSAMMENGESETZTEN SÄTZEN

LEA HAADER

## Auszug

In diesem Artikel untersucht die Autorin, gestützt auf das Material der Bände *A magyar nyelv történeti nyelvtana* [Historische Grammatik der ungarischen Sprache], welche wichtigeren Prozesse die Herausbildung und Entwicklung der ungarischen zusammengesetzten Sätze bis zum Ende der altungarischen Zeit gelenkt haben. Dabei beschäftigt sie sich ausführlicher mit den Grammatikalisierungsprozessen, angesprochen werden aber auch die von Ellipse, Analogie und syntaktischer Synonymie verursachten Veränderungen.

## 1. Einführung

Als Betrachtungsweise von historischen grammatischen Untersuchungen empfiehlt Sándor Károly in einem seiner wichtigen Artikel die sogenannte Mikrodiachronie (Károly 1980). Das heißt: die sprachlichen Veränderungen aufgrund von historischen Synchronschnitten anhand des größtmöglichen verfügbaren Korpus aus den Verschiebungen des Sprachsystems darzulegen; und zwar unter Berücksichtigung der Relationen innerhalb des Systems, des Kampfes der funktionalen Varianten, die in kommunikativer Konkurrenz miteinander stehen, der Synonymieverhältnisse, der am Anfang sporadischen und sich später zum Typ verdichtenden Verschiebungen im Sprachgebrauch, oder im Gegenteil: des Seltenwerdens oder Aussterbens eines bisher existierenden Phänomens. Im Laufe einer mikrodiachronischen Untersuchung[1] darf die Sprache von der sie benutzenden Gemeinschaft nicht getrennt werden. Diese Zusammenschau ist die Existenzgrundlage der historisch-soziolinguistischen Untersuchungen, doch ist sie bei der Erforschung von syntaktischen Veränderungen nicht weniger wichtig, weil der Ursprung einer jeden Veränderung,[2] ganz gleich in welcher

[1] Sie entspricht in gewissem Sinne dem synchronen Aspekt der Grammatikalisierung, ebenso wie Károlys Makrodiachronie (Károly 1980, 48–9) dem diachronen Aspekt (vgl. Diewald 1997, 5).

[2] Eine tatsächliche Erklärung der Veränderungserscheinungen wird hier wegen der bekannten theoretischen Probleme der sprachhistorischen Erklärung nicht unternommen

sprachhistorischen Epoche, im wirklichen Sprachgebrauch, in der Kreativität des Sprechers in der Praxis liegt. Deshalb ist es eine wichtige Bestrebung der historisch-syntaktischen Untersuchungen, aus dem geschlossenen Korpus die Tatsachen der gesprochenen Sprache zu erheben.[3]

Die Möglichkeit zu einer mikrodiachronischen Untersuchung haben die detaillierten synchronen Schnitte der verschiedenen Subsysteme der frühen Epochen (urungarische Zeit und Antezedenzien sowie früh- und spätaltungarische Zeit) in der drei Bänden der *Historischen Grammatik des Ungarischen* geschaffen.[4] Ich selbst habe in den entsprechenden Bänden der *A magyar nyelv történeti nyelvtana* [Historische Grammatik des Ungarischen] (Benkő et al. 1991; Benkő – Rácz 1995) die Entwicklung der Satzgefüge bis zum Ende der altungarischen Zeit untersucht. In der vorliegenden Studie wird versucht, anhand der zahlreichen — nur aufgrund mikrodiachronischer Untersuchungen kennenzulernenden — kleinen Veränderungen im Laufe der Geschichte der Satzgefüge des Ungarischen die allgemeineren Merkmale dieser Entwicklung herauszuarbeiten, jene Prozesse also, die in dieser unbestreitbar wichtigsten Phase ihrer Entstehung, Stabilisierung und Weiterentwicklung, also bis zum Ende der altungarischen Zeit, determinierend waren.

Die Veränderungen der zusammengesetzten Sätze werden bis zum Ende der altungarischen Zeit vor allem von folgenden Prozessen bestimmt — natürlich nicht unabhängig voneinander, sondern mehr oder weniger ineinander verflochten:

- Grammatikalisierungsprozesse
- Elliptische Prozesse
- Streben nach der Symmetrie des Systems (Analogie)
- Wettstreit synonymer Strukturen (syntaktische Synonymie)

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(vgl. Herman 1982, 3–5). Dies wäre auch deshalb nicht empfehlenswert, weil die bedeutende Rolle der situativen Umdeutung beim Zustandekommen der langsamen Verschiebungen und Veränderungen gerade im Zusammenhang mit einigen der weiter unten zu besprechenden Prozesse wirklich deutlich wird und somit Károlys Skeptizismus hinsichtlich der Frage nach den Gründen rechtfertigt (Károly 1972, 123–4). Was hier und dort erwähnt wird, erreicht lediglich das Niveau einer aus dem Sprachmaterial zu ziehenden primären Schlussfolgerung.

[3] Zum Begriff der Ersatzkompetenz s. Forgács (1993–1994).

[4] Die historischen synchronen Schnitte werfen diverse theoretische Probleme hinsichtlich des Zeitbegriffs sowie der Homogenität des Sprachsystems auf (vgl. Benkő 1975; 1988; 1993; Cherubim 1975; Péter 1967; Tolcsvai Nagy 1993 usw.), von denen hier jedoch abgesehen wird.

Von diesen wird im Folgenden eingehender die erste Gruppe besprochen, die übrigen systemschaffenden oder -verändernden Faktoren werden um der vollständigeren, umfassenden Darstellung willen andeutungsweise erwähnt, aber nicht ausführlicher behandelt. Veränderungen, die infolge einer Kontamination von Strukturen oder durch syntaktische Entlehnung zustande gekommen sind, bleiben unerwähnt, da diese — obwohl sie in der Syntax von Bedeutung sind — im Subsystem der zusammengesetzten Sätze eine peripherere Rolle spielen.

## 2. Grammatikalisierungsprozesse

Hinsichtlich der Entstehung und Veränderung der zusammengesetzten Sätze[5] haben Grammatikalisierungsprozesse die größte Bedeutung.[6] Sie werden allgemein folgendermaßen charakterisiert: Es wird untersucht, unter welchen Umständen und infolge welcher Veränderungen ein sprachliches Element seine Kategorie wechselt, seine Selbständigkeit verliert, wie z. B. ein lexikalisches Zeichen zu einem grammatikalischen (eine Grundwortart zum Verhältniswort) wird. Für die Satzgefüge ist es wohl noch typischer als für viele andere grammatische Phänomene, dass sie durch eine spezielle Grammatikalisierung entstanden sind. Darauf deuten die spezifischen Eigenschaften derjenigen Elemente hin, die den Syntaktisierungsprozess (auch) morphologisch ausdrücken. Die Konjunktionen und Korrelate, die die syntaktische Beziehung zwischen den Gliedsätzen anzeigen, setzen sich von vornherein aus der Klasse der Pronomina zusammen — die zwar eine Grundwortart sind, jedoch keine autosemantische Bedeutung haben. Entweder ist ihre einzige Funktion das Verbinden (Einleiten) von Gliedsätzen (Relativpronomen), oder sie wurden durch semantische Entleerung aus Relativpronomen aufgrund von Grammatikalisierungsprozessen zu sogenannten wirklichen Konjunktionen (z. B. *hogy* 'dass', *mert* 'weil', *ha* 'wenn'). Dies ist ein sehr alter Prozess, der in der urungarischen Zeit, aus der keine Sprachdenkmäler vorhanden sind, anzusiedeln ist, sich jedoch rekonstruieren lässt (s. unten).

[5] Im folgenden befasse ich mich in erster Linie mit den Satzgefügen. Die Satzreihen werden üblicherweise von vornherein als solche beschrieben, in denen zwischen den Gliedsätzen eine logische Verbindung besteht, welche die (grammatikalisierte) Konjunktion (lediglich) ausdrücken kann (vgl. Kugler 2000, 374). Von diesen werden nur solche Fälle behandelt, bei denen die Unterordnung mitbetroffen ist.

[6] Von den neueren Studien, die sich mit den Grammatikalisierungsprozessen im Ungarischen befassen, hebe ich folgende hervor: Forgács (1999); Ladányi (1998) (diese auch mit theoretischem Anspruch) und Ladányi (1999). Allerdings behandeln diese die speziellen Grammatikalisierungsprozesse in den zusammengesetzten Sätzen nicht.

## 2.1. Die Entstehung der Satzgefüge

Bekanntlich sind die Satzgefüge als syntaktische Strukturen aus freien Textsätzen (Diskursstrukturen) entstanden. Ihre beiden Typen — *dass*-Sätze und Relativsätze — sind durch Verkettung, Grammatikalisierung entstanden, und zwar so, dass jeweils andere in pragmatisch determinierter Reihenfolge stehende Antezedenssätze zu syntaktischen Regeln unterliegenen Gliedsätzen geworden sind.

**2.1.1.** Von den Antezedenssätzen der Satzgefüge mit der Konjunktion *hogy* 'dass' erwartet der erste einen Inhalt und wird aus diesem Grunde als sogenannter Rahmensatz bezeichnet (vgl. Hadrovics 1969, 193). Es ist wichtig, dass diese Rahmensätze sich in Gruppen ordnen lassen, die semantisch gut zu umschreiben sind: Mitteilung, Gefühl, Wahrnehmung, geistige Tätigkeit, bewertendes Adjektiv usw. Zum Beispiel: *Félek.* 'Ich habe Angst.' *Látom.* 'Ich sehe es.' *Tudjuk.* 'Wir wissen es.' *Félelmetes.* 'Fürchterlich.' *Jó.* 'Gut.' Im folgenden Satz des Diskurses, dem zweiten, noch selbständigen Satz, steht das eigentliche Mitzuteilende, z. B. *Medve közeledik.* 'Ein Bär nähert sich.' Die Möglichkeit der Grammatikalisierung (später dann zahlreiche wichtige Charakteristika der *dass*-Sätze, einschließlich ihre weiteren Entwicklungsrichtungen) gewährleisten die Eigenschaften des ersten Satzes: sie werden mit entsprechender Häufigkeit gebraucht, außerdem drücken sie aufgrund ihrer Bedeutung ein Verhältnis zum konkreten Redeinhalt aus. Die durch die Grammatikalisierung entstandene syntaktische Abhängigkeit wird (kann) auch durch eine Konjunktion im Nebensatz ausgedrückt (werden), deren Auftreten, die Morphologisierung, jedoch späteren Datums ist. Daran erinnern die bis heute vorkommenden Sätze ohne Konjunktion.

Die ungarische Konjunktion *hogy* dürfte durch eine weitere semantische Entleerung eines für die Zustands- bzw. Modalbestimmung gebräuchlichen Relativpronomens bereits vor der mit Sprachdenkmälern belegten Zeit entstanden sein. Für den einstigen Grammatikalisierungsprozess könnte man (mit Hilfe paralleler Bibelübersetzungen) folgende Phasen rekonstruieren:

„lata ǫ napat *fèkette* / *ꝫ hideg lelettè*“ 'Er sah seine Schwiegermutter liegend und Schüttelfrost leidend' (MünchK. 14rb) ∼ „Lata hw napat veȝteg *fekwen feÿet faÿdalwan*“ 'Er sah seine Schwiegermutter bewegungslos liegend über Kopfschmerzen klagend' (JordK. 376). Diese sind nur Vorläufersätze; anstelle von Nebensätzen wird in ihnen eine Partizipialkonstruktion verwendet, die Partizipialadverbien haben die Funktion von Zustandsbestimmungen.

Dasselbe mit einem — in syntaktischer Hinsicht als synonyme Struktur zu betrachtenden — Nebensatz: „lata aʒ ew napat *hogÿ fekennek ees hÿdeg lelne*" 'Er sah seine Schwiegermutter, wie/dass sie lag und Schüttelfrost litt' (Pesti 14b).

Die Möglichkeit der Umdeutung ist in diesem und in ähnlichen Gruppen von Gliedsätzen gegeben. Das *hogy* kann die Bedeutung „ahogy" 'wie' haben (dies entspricht dem partizipialen Satzglied), es kann aber auch asemantisch (inhaltslos) sein: „Látta (azt a tényt), hogy az ő napa fekszik, és a hideg leli" 'Er sah (die Tatsache), dass seine Schwiegermutter liegt und Schüttelfrost leidet'. Hier handelt es sich bereits um eine Darlegung des Inhalts, also einen sogenannten Inhaltssatz (vgl. Hadrovics 1969, 194–5). Das *hogy* hat selbst seine pronominale Bedeutung verloren, eine grammatische Bedeutung (Ausdruck einer Beziehung) angenommen und zeigt lediglich die syntaktische Abhängigkeit vom Hauptsatz. (Vgl. auch Juhász 1991, 479.)

**2.1.2.** Die Antezedenssätze der Relativsätze standen im Diskurs genau in der umgekehrten Reihenfolge: an erster Stelle der spätere Nebensatz und danach der spätere Hauptsatz, z. B. *Ki fél? Jöjjön hozzám!* 'Wer hat Angst? Er/sie komme zu mir!' *Hova mész? Elkísérlek.* 'Wohin gehst du? Ich begleite dich.' Die Entstehung eines Satzgefüges wird durch die Funktionsveränderung: selbstständiges Fragepronomen → Relativpronomen mit Konjunktionsfunktion angezeigt; dies vollzieht sich in folgenden Phasen: Fragepronomen (*Ki? Hova?* 'Wer? Wohin?') → Fragepronomen/unbestimmtes Pronomen (*Ki/Valaki* ... 'Wer/Irgendwer...'; *Hova/Valahova* ... 'Wohin/Irgendwohin ...') → unbestimmtes Pronomen/Relativpronomen (*Valaki/Aki* ... 'Jemand/Der ...'; *Valahova/Ahova* ... 'Irgendwohin/Wohin ...') → Relativpronomen (*Aki* ...; *Ahova* ... 'Der ...; Wohin ...').

Als die wichtigsten Momente des Syntaktisierungsprozesses sind die Veränderungen der Intonation anzunehmen, die anfangs noch nicht mit einer Morphologisierung, einer Differenzierung der Form einhergingen: Das Frage- und das Relativpronomen blieben bis zur späten altungarischen Zeit Homonyme (s. auch weiter unten).

**2.1.3.** Die Grammatikalisierungsprozesse bei der Entstehung der Satzgefüge sowie ihrer weiteren Veränderung lassen sich also in folgendem Schema zusammenfassen:

Diskurs → (Syntaktisierung) → Syntax → (Morphologisierung) → Morphologie[7]

Die Suche nach den Gründen für sprachhistorische Veränderungen ist eine Anstrengung mit zweifelhaftem Ausgang (s. auch Anm. 4). Dennoch ist es üblich, außersprachliche Motive und solche innerhalb des Sprachsystems zu unterscheiden.[8] Givón (zitiert von Diewald 1997, 14) gibt als Grund für den ersten Teil des Schemas, also die syntaktischen Veränderungen, das kommunikative Bedürfnis an, während er für die Grammatikalisierungsprozesse, die die Morphologie und die Phonologie betreffen, eine phonologische Schwächung annimmt. Aus einer zeitlichen Entfernung solcher Größenordnung, mit der wir es hier zu tun haben, ist jedoch selbst der Versuch vergeblich, außersprachliche Faktoren, die beim Sprachwandel eine Rolle gespielt haben können, zu ergründen.[9] Bei der Entstehung der Satzgefüge aus selbstständigen Sätzen des Diskurses im Ungarischen scheinen eher Veränderungen phonetischen Charakters (z. B. Intonation, Sprechtempo) für die Induktion der Grammatikalisierungsprozesse von größerer Bedeutung gewesen zu sein. Die Vollständigkeit der Kommunikation war auch im Falle der sogenannten textologischen Unterordnung gewährleistet. Die Veränderung der Intonation hat sich auch bei den späteren, die Syntax betreffenden Grammatikalisierungsprozessen als entscheidend erwiesen, außerdem ist sie — als Faktor von phonologischen/morphologischen Veränderungen — universeller.

### 2.2. Sonstige Veränderungen

Bei den weiteren Grammatikalisierungsprozessen der Satzgefüge gibt es zwei grundlegende Richtungen sowie deren Kombinationen:

[7] Das von Diewald aufgrund von Givón angegebene Schema (s. Diewald 1997, 18) geht noch weiter: → (Demorphemisierung) → Morphonologie → (Schwund) → Null. Die Veränderungen, die in diesem Teil des Schemas dargestellt werden, betreffen die Veränderungen der zusammengesetzten Sätze jedoch nicht mehr.

[8] Károly betont bei der Entstehung sprachlicher Veränderungen die Rolle der Gegensätze zwischen der Zeichensituation im engeren und im weiteren Sinne (also dem Mikro- und dem Makrofeld). Solche sind z. B. Zeichensystem und Gesellschaft, Zeichensystem und Kultur, Zeichensystem und Redeprodukt usw. (Károly 1972, 121).

[9] Vor allem, wenn man berücksichtigt, wie viele Faktoren zu dem Makrofeld gehören, die die sprachlichen Veränderungen beeinflussen: ontologische, kulturelle, soziologische Strukturen usw. (Károly a. a. O.); s. auch die vorangehende Anmerkung.

**Eintritt** in die grammatischen Kategorien der Satzgefüge:[10] Entstehung von Konjunktionen und Korrelaten;

**Austritt** aus dem Satzgefügerahmen: aus dem Hauptsatz entstandene Modalwörter und Partikel;

**Austritt sowie Eintritt**: aus dem Hauptsatz entstandene Konjunktionen;

**Abbruch des Austritts**: modale Satzteile, entstanden aus einem Nebensatz oder einem Hauptsatz.

**2.2.1. Eintritte** erfolgten in großer Zahl bis zum Ende der altungarischen Zeit. Hier seien nur einige typische erwähnt.

**2.2.1.1.** Die Grammatikalisierungsprozesse der **Konjunktionen**. Von der Entstehung der asemantischen Konjunktion *hogy*, ihrer Umdeutung aus einem relativen Element, war bereits die Rede. Da in den *dass*-Sätzen, den sogenannten Inhaltssätzen, der Nebensatz den Inhalt darlegt, ist dies ein grundlegender Typ im System der Nebensätze. Er unterliegt bis heute keinerlei Veränderungen.

Die Entstehung der Konjunktion des relativen Satztyps sowie der diesbezügliche Grammatikalisierungsprozess wurden ebenfalls schon erwähnt. Die Umdeutung des Fragepronomens zum Relativpronomen ging anfangs nicht mit einer Unterscheidung der Form einher. Zu Morphologisierungen kommt es im allgemeinen bei schon früher erfolgten Prozessen. Das Präfix, das das Relativpronomen vom Fragepronomen (und vom unbestimmten Pronomen) unterscheidet, entstand in der altungarischen Zeit. Es wurde aus einem im Hauptsatz stehenden substantivischen Demonstrativpronomen mit der Funktion eines Korrelats grammatikalisiert. Bevor wir zu den Voraussetzungen für die einzelnen Phasen dieses Prozesses kommen, muss als Grundbedingung das Vorhandensein des Korrelats erwähnt werden. Das Auftreten des Korrelats im Hauptsatz hängt mit der stärkeren Markierung der Konstruktionsweise, der zweifachen syntaktischen Bindung (Korrelat zusätzlich zur Konjunktion) zusammen. Die Zahl der Hinweise auf den Nebensatz, d. h. der Korrelatelemente, nimmt mit der Zeit zu; in den Textdenkmälern der frühen altungarischen Zeit sind sie noch selten. Auch hieraus folgt, dass die Beseitigung der Homonymie erst in der altungarischen Zeit und nicht früher erfolgt sein kann.

Weitere Voraussetzungen für den Grammatikalisierungsprozess sind: entsprechender Kontext, d. h. Quellbereich, und entsprechende Reihenfolge der Gliedsätze; Wortfolge und Intonation. Die Phasen der Veränderung sind: →

[10] Die grammatische Kategorie wird hier nicht im engeren Sinne verwendet (Lotz 1974), sondern zur Bezeichnung der freien Morpheme (Konjunktionen, Korrelate), die in der Struktur des zusammengesetzten Satzes typische grammatische Funktion haben.

Verschiebung der Gliedsatzgrenze → Klitisierung, d. h. Fusion der selbstständig stehenden Morpheme → morphologische Reduktion. Hierzu als Beispiel die Entstehung von *aki, ami* 'der (derjenige), welcher, das':

(1) Mÿćzoda te hozzad kepesth *az kÿ* te raÿtad bozzoth toth 'Wie ist im Vergleich zu dir *derjenige, der* an dir Ärgernis verübt hat' (ApMélt. 26)

(2) te vaġ *aʒ, ki* iocat meg ṅomocʒ 'du bist derjenige, der die Guten unterdrückt' (GuaryK. 29)

(3) Tahat *aʒ ki* fɵ meg mõdhatt·a riuiden 'Also der, der der Vorgesetzte ist, kann es kurz erklären' (BirkK. 4b)

(4) Az mÿnemew foglÿok ÿth wadnak az egÿk *az kÿ* az zÿwrkoth Monÿorokerekbe kÿldÿ wolth az Bÿnes 'Von den Gefangenen, die hier sind, ist der eine derjenige, der das Pech nach Monyorókerék geschickt hat, der war der Schuldige' (1530 : KLev. 95.)

Die Quellbereiche der Veränderungen sind: hauptsächlich Subjekt- (1), (3), seltener Prädikatsätze (2) und sporadisch Satzgefüge, in denen Subjekt oder Prädikat durch einen Appositionalsatz interpretiert wird (4) — deshalb nur diese Satztypen, weil es eine Voraussetzung ist, dass das substantivische Demonstrativpronomen-Korrelat keine Flexionsendung enthält, das die spätere Klitisierung behindern würde. Reihenfolge der Gliedsätze: Hauptsatz steht vorne (1), (2), oder der Nebensatz ist nach dem Korrelat in den Hauptsatz eingefügt (3), (4). Auch diese Voraussetzung zeigt, weshalb die Morphologisierung nicht früher stattfinden konnte: Die Relativsätze wurden aus den selbstständigen Sätzen des Diskurses mit der Reihenfolge Nebensatz–Hauptsatz grammatikalisiert (s. **2.1.2.**). Dazu, dass die umgekehrte Reihenfolge der Gliedsätze entsprechend häufig werden konnte, war vielfacher automatisierter Gebrauch, also Zeit, erforderlich. Wortfolge: Korrelat an der Gliedsatzgrenze, d. h. am Ende des Hauptsatzes; Konjunktion ebenfalls an der Gliedsatzgrenze, d. h. am Anfang des Nebensatzes. Diese Voraussetzung ist normalerweise erfüllt, es sei denn, es gibt einen Grund für Inversion (z. B. Gedicht). Akzentverhältnisse: Das Korrelat, das seine Fokusposition verloren hat, verliert auf jeden Fall etwas von seiner Betonung. Die Klitisierung lässt sich bei einem Teil der Daten, eben wegen des fehlenden morphologischen Beweises, nur schwer und indirekt, in einigen Fällen gar nicht belegen (vgl. Haader 1995, 518). Da in der Rechtschreibung eine entsprechende Norm fehlte, bietet die Zusammen- oder Getrenntschreibung keine Anhaltspunkte. Günstigenfalls gibt ein Interpunktionszeichen Aufschluss darüber, in welchem Stadium der Prozess ist. Ein solches ist das Satzzeichen in Beispiel (2) aus dem Guary-Kodex, denn diesen Kodex hat der Skriptor nach dem Kopieren des Textes mit Interpunktionszeichen versehen, und zwar im Vergleich zum damaligen Usus relativ konsequent. Dieses Beispiel belegt also, dass die Klitisierung hier noch nicht erfolgt ist. Ein Beweis für die Fusion der beiden Lexeme ist das assimilierte *z* des Demonstrativpronomens (sprich: *akki*); später dann (z. B. in Káldis Bibelübersetzung von 1626) seine Ersetzung durch ein Apostroph und schließlich der völlige Schwund.

Hinsichtlich der Untersuchung des Morphologisierungsprozesses ist der Birk-Kodex (entstanden 1474) ein Glücksfall. Er ist nämlich der einzige autographe altungarische Kodex, und zwar das Konzept eines Dominikanermönches der Übersetzung von Ordensregeln, mit zahlreichen Verbesserungen (Streichungen und Einfügungen). Aus der Übersetzung ist ersichtlich, dass die Grammatikalisierung beim Typ *ami* wesentlich weiter fortgeschritten war als beim Typ *aki*. Im Falle des ersteren finden sich dreimal so viele Relativpronomen mit Präfix als ohne solches. Die Streichungen und Verbesserungen des Übersetzers lassen den Verlauf der Morphologisierung erkennen. Der Übersetzer beginnt mit der Form *az mi* des Relativpronomens, dann verbessert er das *az* gleich zweimal zu der assimilierten Form *am* und benutzt es auch weiterhin so. Die auch in der Zusammenschreibung sichtbar werdende Proklise kommt nur einmal vor. Wir können dennoch davon ausgehen, dass die Fusion bereits stattgefunden hat. Es dürfte keine allzu falsche Annahme sein, dass die auffällige zeitliche Differenz in der Entwicklung von *ki* und *mi* zwei Gründe haben kann. Zum einen war die funktionale Belastung von *ki* in der altungarischen Zeit um ein Vielfaches größer als die von *mi*, da es für die verschiedensten Denotate (belebte und unbelebte) gebraucht und somit zu einer geläufigen, konservativen Form wurde. Zum anderen haben die Relativpronomen ohne Präfix ihre morphologische Struktur deshalb geändert, weil damit gewisse störende Homonymien beseitigt werden konnten. Im Fall von *mi* gab es eine Homonymie mehr, nämlich mit dem Personalpronomen der 1. Pers. Pl. Hier ist unbedingt anzumerken — obwohl es den Verlauf des hier aufgezeigten Grammatikalisierungsprozesses nicht betrifft —, dass die Kodizes hinsichtlich des Fortschreitens des Prozesses große Schwankungen aufweisen (vgl. G. Varga 1992, 526–9), was ja gerade das Normale bei den Grammatikalisierungsprozessen ist.

Diese Veränderung hat sich allerdings beim palatalen Gegenstück des Demonstrativpronomens — trotz entsprechender anfänglicher Entwicklungen und des Eintritts in den Grammatikalisierungskanal — nicht vollzogen. Einige Kodizes, die — vermutlich regionalspezifisch — statt eines velaren ein palatales Demonstrativpronomen als Korrelat verwendeten (z. B. GuaryK., NádK., ÉrsK.), weisen zwar einige Relativpronomen als Konjunktion(en) mit dem Präfix *e(z)* auf: „*eez myt* mondaaz myes twgyok“ 'das, was du sagst, wissen wir auch' (ÉrsK. 488); auch in der klitisierten, assimilierten Form: „*Emmyt* tee thez meg ſem te dolgod" 'Das, was du tust, ist trotzdem nicht deine Sache' (ÉrsK. 460); „*E míth* írtam meg híuatatlan írtam" 'Das, was ich geschrieben habe, habe ich ungebeten geschrieben' (NádK. 266); doch später kam diese Entwicklung zum Stillstand und verschwand schließlich. All dies hängt damit zusammen, dass später auch das Korrelat in seiner velaren Form zum Teil der normativen Sprachvariante wurde.

Der Entstehungsprozess der zusammengesetzten Relativpronomen hat — mutatis mutandis — auch in anderen Fällen Modellwert. Diese Art der Veränderung, bei der das neue Element durch die Reanalyse der bereits vorhandenen Morpheme entsteht, entspricht dem Bedürfnis der Sprachökonomie. Mehrere in Satzgefügen gebräuchliche Konjunktionen sind durch Grammatikalisierung dieser Art entstanden. Selbstverständlich gingen diese Veränderungen von jeweils anderen Quellbereichen aus, doch im Grammatikalisierungskanal fanden ähnliche Ereignisse statt: Das Korrelat wurde zur Konjunktion klitisiert, und dieser Phase gingen Veränderungen der Wortfolge, der Betonung sowie eine Verschiebung der Gliedsatzgrenze voraus. Eine morphologische Reduktion erfolgte hier jedoch nicht. (Zu den Details der Entwicklung s. Juhász 1992, 791–2; Rácz 1995, 700.) Die auf diese Weise entstandenen Konjunktionen (*úgyhogy* 'so dass', *úgymint* 'und zwar', *olymely* 'gleichsam', *olymint* 'gleichwie', *olymiképpen* 'gleichwie', *olyha* 'als ob', ja sogar *olymelyha* 'als ob') erschienen in Sätzen — nach der im Ungarischen üblichen Terminologie — mit sogenanntem spezifisch semantischen Inhalt. Für diese Klasse von Sätzen gilt allgemein, dass sie syntaktisch weniger abhängig sind und manchmal von der Unterordnung zur Beiordnung übergehen, semantisch aber besonders reichhaltig sind. Die semantische Fülle gilt besonders für den Satztyp, der gleichzeitig zwei von den spezifisch semantischen Inhalten ausdrückt, also für die sogenannten konditional komparativen Sätze. Die oben genannten Konjunktionen (mit Ausnahme von *úgyhogy*) leiteten im Altungarischen diese Art von Sätzen ein.[11] Wenn die Fusion von zwei Lexemen keine morphologischen Veränderungen nach sich zieht, so ist das auf einen Platz an der Peripherie des Systems, eine größere Variabilität und Beweglichkeit sowie ein neueres Entstehungsdatum zurückzuführen. Der Klitisierung kann auch die Morphemstruktur der Elemente im Wege stehen: Aus der Verbindung Korrelat–Konjunktion *annyira hogy* 'so sehr, dass' ist keine Konjunktion geworden, obwohl abgesehen von der schwerfälligen Morphemstruktur alle Voraussetzungen für die Grammatikalisierung vor-

[11] Die infolge der Grammatikalisierung entstandenen Paare sind deutlich zu erkennen: *mint, miképpen* — komparative Konjunktionen ~ *úgymint, olymint, olymiképpen* 'und zwar, gleichwie, gleichwie' — konditional komparative Konjunktionen; *ha* 'wenn' — konditionale Konjunktion ~ *olyha* 'als ob' — konditional komparative Konjunktion.

handen waren. Beweise dafür, dass es Versuche einer derartigen Veränderung gegeben hat, liefern z. B. folgende Sätze: „meg wÿgaʒta ewtet, *annÿra hogÿ* iarna ees ʒolna“ 'Er heilte ihn, so sehr, dass er gehen und sprechen konnte' (Pesti 23b); „Ees nem felele nekÿ chak egÿ ʒowalÿs, *wgÿ annÿra hogÿ* az feÿedelem igen meg chodalkoznek raÿta“ 'Und er antwortete ihm nicht ein einziges Wort, so sehr nicht, dass der Fürst sich darüber sehr wunderte' (Pesti 62b; ähnlich auch an der entsprechenden Stelle bei Károlyi).

**2.2.1.2.** Auch **Korrelate** sind in Grammatikalisierungsprozessen solcher Art entstanden. Die Quellbereiche waren natürlich ebenso wie die kommunikativen Motive andere. Zur Illustration werden hier Korrelate zu Gradbestimmungssätzen ausgewählt. Die Nebensätze mit Gradbestimmung haben sich aus der Gruppe solcher mit Modalbestimmung abgesondert, und zwar dadurch, dass sie außer der Art der Handlung — eher noch darüber hinaus — auch deren Intensität zu bezeichnen begannen. Es handelt sich um Nebensätze wie die folgenden, die sich auf das verbale Grundglied des Hauptsatzes beziehen:

(5) *meg fogyathkoznak* mykeppen fyſth fogyathkozyk meg 'Sie werden weniger, wie der Rauch weniger wird' (KeszthK. 88–9)

(6) en aʒ ſebeknek helyt *vgÿ vakarom el* hogÿ ſonha touaba meg nem ÿelennek 'Ich kratze die Stellen der Wunden so weg, dass sie nie wieder erscheinen' (JókK. 67)

Gradbestimmungssätze sind von expressiver, gefühlsgeladener Art.[12] Sie kommen auch nicht in „neutraler“ Form vor, sondern ausschließlich mit einer zusätzlichen Bedeutungsnuance. Die Intensität der Handlung (des Geschehens), der Eigenschaft und der Menge wird stets durch einen komparativen oder konsekutiven Nebensatz ausgedrückt.

An der Entstehung der Korrelate können also zwei Faktoren beteiligt gewesen sein: das Bestreben, eine (zumindest teilweise) Unterscheidung von den Modalsätzen zu erreichen, sowie das Bestreben, die Intensität in angemessener Weise zum Ausdruck zu bringen. Es wurde bereits mehrmals erwähnt, dass eine Voraussetzung für den Beginn und den Ablauf der Grammatikalisierungsprozesse die entsprechende Häufigkeit des zu verändernden Elements in der Kommunikation ist. In dieser Hinsicht war die altungarische Zeit ideal für die Grammatikalisierung der Gradbestimmungssätze, da die Predigten und Legenden auffallend viele Gradbestimmungssätze enthielten, manchmal auch

[12] Expressivität ist nicht identisch mit dem Gefühlsausdruck, sondern ein weiter gefasster Begriff (Péter 1991, 41). Der sprachliche Ausdruck des Gefühls ist jedoch immer expressiv.

in langen Reihen: „es mikoron az bezedeket halotta volna az wrdwg. ... meg haraguek. *anera hogi asis melet valo kw hegieket. meg zagata. vgi hogi. az nagi kw zakadasokat egibe vere. oli igen. hogi ebwl lwn czatogas es nagi villamas es twznek nagi zikrazasa.* es lwn olÿ igen nagion. *hogi ez nagi zwrnÿwsegre bodogsagos zent Ferencz. es mind w tarisi acellabol ky hertelēkedenek*“ 'und als der Teufel die Reden hörte, ... wurde er böse, so sehr, dass er die bei Assisi gelegenen Steinberge zerriss, so dass er die großen Steinbrocken gegeneinander schlug, so sehr, dass daraus ein Krachen und großes Blitzen wurde und großes Funkensprühen von Feuer, und dies wurde so sehr stark, dass auf diese Furchtbarkeit der gebenedeite heilige Franziscus und all seine Kameraden aus der Zelle herauseilten' (VirgK. 22).

Das typische Korrelat in den Satzgefügen der Gradbestimmung in der altungarischen Zeit war *olyigen (oly igen)* 'so sehr'. Seine Entstehung läßt sich folgendermaßen rekonstruieren:

(7) kezde lennÿ ez gÿermek *jgeen* jo elmeÿv : mÿkeppen az : kÿ istentevl nÿert jo lelket 'das Kind begann sehr klug zu werden, so wie einer, der von Gott eine gute Seele bekommen hat' (DomK. 4)

(8) Twdom wala hogÿ aȝ en fÿan [sic!] *igen* bewlch hogÿ ha terwenbe viendik magath meg Menthÿ 'Ich wusste, dass mein Sohn sehr weise ist, wenn sie ihn vor Gericht bringen, wird er sich retten' (AporK. 218)

Das Lexem *igen* 'sehr' — das selbst ein Gradadverb (oder eher noch eine Steigerungspartikel) ist — drückte schon im Hauptsatz die Intensität des im Grundglied genannten Begriffs aus, und der Nebensatz — als sogenannter adverbialappositionaler — betonte bloß den Inhalt des Hauptsatzes. Aus pragmatischen Gründen war jedoch der grammatische Ausdruck eines stärkeren Akzents des Gefühls und der Intensität erforderlich, weshalb vor das *igen* noch das Korrelat *oly* 'so' eingeschoben wurde:

(9) *olÿ igen* megh rettentek az pinztewl hogh Semmj Marhamra nem Merÿk az yo pinzt kezekbewl ki adnj 'sie erschraken so sehr vor dem Geld, dass sie für keines meiner Güter das gute Geld aus der Hand zu geben wagten' (1531 : KLev. 97.).

Die Entwicklung zum einheitlichen Korrelat (und darüber hinaus die Vitalität des aufgezeigten Prozesses, die Unersättlichkeit des Bedürfnisses nach der Steigerung der Intensität und der Expressivität) beweisen Angaben, in denen sich das obige Muster — nun schon mit dem Korrelat *oly igen* — wiederholt:

(10) mi raÿtonc *ol' igǫn nag̍on* kǫn̍ǫrüle, hoġ magat nē kemele erǫttǫnc 'er erbarmte sich unser so sehr sehr, dass er sich um unsretwillen nicht schonte' (G̍uaryK. 77).

Die Klitisierung ging nicht mit morphologischen Veränderungen einher. Da bei diesem Veränderungsmodell der Beweggrund sehr stark war, gelangten verschiedene Ausgangselemente in den Grammatikalisierungskanal: *nagy* 'groß', *nagyon* 'sehr', *erősen* 'stark (Adv.)', *felette* 'äußerst' bzw. *olyan* 'derartig', *ily* 'so', *ilyen* 'so' (vgl. Haader 1995, 632). Die Vielfalt dieser Elemente wirkte jedoch der morphologischen Stabilisierung entgegen.

Auf das kontinuierlich vorhandene Bedürfnis nach Expressivität deutet des weiteren hin, dass im Altungarischen auch bereits existierende Korrelate weiterer Betonungssteigerung unterlagen. Durch diese Prozesse entstanden die altungarischen Korrelate *azannya, ezennye, azannyira, ezennyire, azannyiban, elannyira* und *úgyannyira* (alle: 'so sehr, dermaßen').

**2.2.2. Austritt** aus der Kategorie der Satzgefüge. Hier werden in erster Linie diejenigen Veränderungen behandelt, bei denen der Hauptsatz infolge von Grammatikalisierungsprozessen aufhört, ein Hauptsatz zu sein. Er ändert also seine Kategorie, d. h. seine sprachliche Ebene, und erscheint infolge der Morphologisierung vor allem in der Gruppe der Modalwörter und Partikel (*bár* 'wenngleich', *bizony* 'wahrlich, gewiss', *hadd* 'lass (+ Verb)', *lám* 'siehe da', *talán* 'vielleicht', *tán* 'vielleicht' usw.). Der Quellbereich, von dem diese Veränderungen ausgingen, ist eine Gruppe der Sätze mit *hogy* (Inhaltssätze), deren Hauptsatz (im engeren oder weiteren Sinne) eine Wertung enthält, die Stellungnahme, die Sprecherattitüde hinsichtlich des Nebensatzinhaltes ausdrückt: *Bizony (az), hogy* ... 'Gewiss (ist), dass ...'; H*agyd (azt), hogy* ... 'Lass (das), dass ...'; Látom (azt), *hogy* ... 'Ich sehe (das), dass ...'; *Találom (azt), hogy* ... 'Ich finde (das), dass ...' usw. Da die durch Grammatikalisierung entstandenen neuen Elemente den Bestand solcher Wortarten bereicherten, die zwischen dem (den) sprachlichen Zeichen und der Sprechsituation eine kommunikativ-pragmatische oder modale Beziehung ausdrücken (oder auch grammatische Bedeutung, vgl. auch **2.2.3.**),[13] ist diese Art von Hauptsatz-Quellbereichen vielsagend. Sie zeigen auch, dass die Grundwortarten — obwohl das allgemeine Schema der Grammatikalisierung lexikalisches Zeichen → grammatisches Zeichen ist — dennoch nicht in gleichem Maße geeignet waren, diese Prozesse zu durchlaufen. Aus konkreten Nomina sind keine Verhältniswör-

[13] In MGr. werden die Modalwörter in der Gruppe der Satzäquivalente behandelt (Keszler 2000b, 70). Hinsichtlich der Bewertung der Grammatikalisierungsprozesse ist es jedoch besser, diese gemäß Berrárs Klassifizierung den Verhältniswörtern zuzuordnen (vgl. Faluvégi et al. 1994, 45). H. Molnár drängt auf die Übereinstimmung der Gesichtspunkte von Wortartkategorisierung und Syntax (1968, 27).

ter entstanden,[14] für den Eintritt in den Grammatikalisierungsprozess waren vor allem die Akzidenzbegriffe (Verb, Adjektiv) geeignet — und zwar aus zwei Gründen. Zum einen ist die grammatische usw. Bedeutung abstrakter als die lexikalische. Somit hätte sich wegen der Länge des Weges erstere nur schwerlich aus einem konkreten Nomen entwickeln können — und die Sprache ist bekanntlich ökonomisch. Zum anderen ist für das Einsetzen der Grammatikalisierung, der semantischen Erosion eines Sprachelements, der häufige Gebrauch dieses Elements erforderlich. Es ist leicht zu erkennen, bei welcher Gruppe dies in der Kommunikation der Fall war (und bis heute ist).

Der Veränderungsablauf soll anhand der Entwicklung von *bizony* 'wahrlich, gewiss' zum Modalwort rekonstruiert werden.

(11) *byzon az* hog halz · byzontalan az kedyg · mykoron ... halz meg 'Gewiss ist, dass du stirbst, ungewiss aber, wann ... du stirbst' (HorvK. 132)

(12) Elſeő hÿr nÿlwan valo, *Bÿzon*, hogÿ chấʒấr Ma ʒerdan. Bwdaban vagÿon 'Die erste Nachricht ist offensichtlich, gewiss ist, dass der Kaiser heute, am Mittwoch, in Buda ist' (1543 : MNy. 80 : 511)

(13) *Biʒon* hoġ ettəl kiſſeb bvnekert, haġhatt·ak nemicor nekiknek hoġ aʒon mõdot hel·en lacoʒʒanak 'Gewiss wurde manchen einst für kleinere Sünden als diese befohlen, dass sie an dem besagten Ort wohnten' (BirkK. 3a; vgl. lat. Pro culpis *vero* aliquibus minoribus istis ...)

(14) hogj kẏth mẏh minden athẏa fyvẏh zerelemel megj akarvnk halalnẏh the felsegednek *bẏzonj* mẏes az the felseged keremesseth semẏben megj nem zegẏek 'was wir eurer Hoheit mit aller verwandtschaftlichen Liebe danken wollen, gewiss werden auch wir der Bitte eurer Hoheit durch nichts zuwiderhandeln' (1524 : KLev. 53.)

(15) *byzon* ygen ʒep aʒont latek 'Ich sah wahrlich eine sehr schöne Frau' (JókK. 122)

(16) *Byzon* mondom tynektek nem vezty el eerdemeeth 'Wahrlich, ich sage euch, er verliert sein Verdienst nicht' (ÉrdyK. 106)

(17) De ez *byzony* nem ygaſag 'Aber dies ist gewiss keine Wahrheit' (ÉrsK. 482)

In den ersten beiden Sätzen (11) und (12) bedeutet *bizony* 'sichere Sache, Tatsache, es ist sicher' und steht als vollwertiger Hauptsatz mit (11) oder ohne (12) Korrelat. Die Nebensätze haben Konjunktionen, die Gliedsatzordnung ist Hauptsatz–Nebensatz. In der nächsten Stufe — (13) und (14) — ändert sich die

[14] Man muss bei den suffigierten Formen bestimmter abstrakter Nomina (*tényleg* 'tatsächlich', *esetleg* 'eventuell' usw.) eine Ausnahme machen, wobei auch diese eigentlich wertende Funktion haben, und zwar hinsichtlich Faktivität und Modalität.

Betontheit des Hauptsatzes, er drückt die Sicherheit des im Nebensatz Gesagten nicht mehr zweifelsfrei aus und beginnt die Sprecherattitüde, d. h. die Bekräftigung, zu bezeichnen. Die inhaltliche Betonung liegt im die Proposition enthaltenden Nebensatz. Ein Korrelat kann im Hauptsatz nicht mehr stehen, wohl aber noch eine Konjunktion ((13), auf dem Faksimile ist aber sichtbar, dass sie nachträglich eingefügt wurde), und die Gliedsatzordnung ist noch die ursprüngliche. In den letzten drei Sätzen (15), (16) und (17) hat *bizony* die reine Funktion eines Modalwortes. Selbstverständlich kann hier im (ehemaligen) Nebensatz auch keine Konjunktion mehr stehen, denn es gibt keinen Haupt- und Nebensatz mehr. Das *bizony* kann an erster Stelle bleiben: (15) und (16), doch der endgültige Abschluss des Prozesses kann auch durch die neue Wortfolge gezeigt werden, in der es in den ehemaligen Nebensatz eingefügt ist (17).

Auf die Neigung der wertenden Hauptsätze zur Devalvierung weist ebenfalls hin, dass auch die Formen von *bizony* mit adverbialen Suffixen (*bizonnyal, bizonyával, bizonyában, bizonyára* [alle: 'sicherlich']) eine ähnliche Entwicklung durchgemacht haben. Quellbereich ist dabei natürlich nicht das Prädikat, sondern eine adverbiale Bestimmung.

(18) est Jrhathom miwel az Jgen *bÿzonwal wagyon* hogy terek czasar reank Jew 'das kann ich schreiben, denn es ist sehr sicher, dass der türkische Kaiser uns angreift' (1524: KLev. 48.)

(19) Mÿnden *bÿzonÿal* hogÿ Satanal (= Szata) wolna 'Ganz sicher, dass er bei Szata (Ortsname) ist' (15[2]9: KLev. 79.)

(20) mondaanak az legenÿǫk *bizonÿauaal* hog zepǫk 'die Burschen sagten, gewiss sind sie schön' (SándK. 24)

(21) *byzonyaba* nagy malazt ... volt ez 'dies war wahrlich eine große Gnade' (CornK. 73v)

Der erste Satz (18) entspricht im großen und ganzen den Beispielen (11) und (12), wobei die Faktenmitteilung hier wegen des Kontextes auch etwas durch die Sprecherattitüde nuanciert wird. Mit adverbialer Funktion hat *bizonnyal* zumeist wohl als Ergänzung des Verbs *sein* gestanden, dessen Wegfall dann die Möglichkeit der Verschiebung zum Modalwort bot: (19) und (20). In (19) bildet es den Hauptsatz noch nicht alleine, obwohl *minden* mit Partikelfunktion (ein nahezu ständiger Zusatz) die Entwicklung zum Modalwort eigentlich nicht behindert (vgl. auch *valóbizony* 'wahrlich (verstärkt)'). Die Konjunktion im Nebensatz ist jedoch trotz der (lediglich bekräftigenden) Sprecherattitüde vorhanden. In Beispiel (18) steht keine Konjunktion mehr, es gibt auch kein Satzgefüge; der Prozess ist abgeschlossen.

Das *bizony* hat in der altungarischen Zeit keine morphologische Reduktion erfahren (vgl. aber in der darauffolgenden Epoche — um 1680 — *biz* [EWUng. unter *bizony*], TESz. *biz*). Der Grammatikalisierungsprozess vollzog sich also gerade zu jener Zeit, mitsamt Ausgangs- und Endpunkt sowie den Übergangsstufen.

Hinsichtlich des Verlaufs der Grammatikalisierung sind auch im Falle der Modalwörter und Partikel *talán* 'vielleicht', *tán* 'vielleicht', *lám* 'siehe da', *hadd* 'lass (+ Verb)' und *vajon* 'ob ... (wohl)' — die ebenfalls aus einem Hauptsatz von Satzgefügen entstanden sind — ähnliche Vorgänge anzunehmen, wobei diese sich auch (de)morphologisierten (phonologische Veränderungen erfahren haben) und ihre Grammatikalisierung älteren Datums ist (Juhász 1991, 505; 1992, 825–6).

**2.2.3. Austritt sowie Eintritt** im Rahmen des zusammengesetzten Satzes. Hier handelt es sich in erster Linie um aus Hauptsätzen entstandene Konjunktionen (*avagy* 'oder', *jóllehet* 'obgleich', *tudniillik* 'nämlich', *tudniméit* 'nämlich', *hiszen* 'da (ja)', *azaz* 'das heißt'). Mehrere Schritte der Grammatikalisierung stimmen mit denen der unter **2.2.2.** behandelten Gruppe überein. Die Quellbereiche sind ähnlich, nämlich wertende Hauptsätze im engeren oder weiteren Sinne. Der Unterschied liegt in der Wortart der neu entstandenen Lexeme, die in diesem Falle Verhältniswörter mit grammatischer Funktion sind. Der Quellbereich von *akár* 'ob ... oder' war kein Hauptsatz, sondern höchstwahrscheinlich ein Nebensatz (vgl. EWUng. und Juhász 1991, 487). Die neu entstandenen Konjunktionen bekommen ihre Funktion typischerweise in nebengeordneten Gliedsätzen oder leiten Konzessivsätze ein (*jóllehet*), die in erster Linie von den adversativen Satzreihen abstammen.

Als Beispiele sind hier die Grammatikalisierungsprozesse von *jóllehet* 'obwohl' und *hiszen* 'da (ja)' zu nennen. Es muss betont werden, dass bei der Entwicklung dieser Hauptsätze zu Konjunktionen der jeweilige Kontext eine sehr große Rolle gespielt hat. Mit *hiszen* werden zum Beispiel Sätze mit Folge–Grund-Beziehung eingeleitet; so konnte seine Entwicklung von der Hauptsatzposition zum freien grammatischen Morphem (zur Konjunktion) nur in solchen dreigliedrigen Satzreihen erfolgen, in denen es als mittleres Glied stand, aber die inhaltliche Beziehung der beiden anderen (Rand-) Sätze der logischen Beziehung Folge–Grund entsprach. Die Entstehung der Konjunktion *jóllehet* erforderte ebenfalls einen entsprechenden Kontext, und zwar einen mindestens dreigliedrigen Satz, dessen erster Gliedsatz den in Grammatikalisierung begriffenen Hauptsatz enthielt, auf welchen ein Subjektsatz und danach ein einschränkend adversativer Gliedsatz folgte. Wie bereits erwähnt, ist *jóllehet* zur Konjunktion der Konzessivsätze geworden. Die inhaltliche Seite der konzessiven Beziehung ist die Tilgung der Erwartung. Zu Beginn der Grammatikalisierung war die Erwartung in den ersten beiden Gliedsätzen, die Tilgung im dritten Gliedsatz vertreten.

(22) mert *yol leheth hogy* az leelek keez legyen de az teſt yghen betheg 'denn es kann gut sein, dass die Seele bereit ist, der Körper aber sehr krank' (ÉrsK. 27)

(23) *ÿol lehet* Thomori lewrincz sokat zolt nekÿ, de nem fogadÿa az ew zauat ebe 'obwohl Lőrinc Tomori ihm oft zugeredet hat, nimmt er aber seinen Rat hierin nicht an' (1527: KLev. 66.)

(24) Es ev tarsa erevtelensegtevl es az ehezestevl touab nem mehetne: *jollehet hog* ez keges atÿa kezereÿty vala evtet el mennÿ az vton 'Dieser sein Kamerad konnte vor Kraftlosigkeit und Hunger nicht weitergehen, obgleich dieser gütige Vater ihn zwang, auf dem Weg wegzugehen' (DomK. 85)

(25) mÿndenre, kees volnek, *Jo leheth*, bÿzon Egÿ lowam, sÿncz 'zu allem wäre ich bereit, obgleich ich wahrlich nicht einmal ein Pferd habe' (1530: KLev. 88.)

(26) *Jolleth* azzonunk: ne zikoͤlkoͤdoͤt legoͤn az megh tyztulaſra ... de maǵa alkolmas loͤn felueni 'Obgleich unsere Frau der Reinigung nicht bedurfte ... aber sie selbst war geeignet, diese anzunehmen' (TihK. 173)

Die Besonderheit dieses Grammatikalisierungsprozesses besteht darin, dass er weit gefasst war. Zwar entstand auch aus dem Hauptsatz *lehet* 'es kann sein' eine Konjunktion (*lehet* lelek kezs: de test beteg 'obgleich die Seele bereit ist, ist doch der Körper krank'; DöbrK. 447), doch wurde das betonte *jól lehet* 'es kann gut sein' zur typischen Ausgangsform. Da die Hauptsätze, die in den Grammatikalisierungsprozess eintraten, zumeist Prädikate ohne Ergänzungen zu sein pflegen, ist dies schon eine ungewöhnliche Erscheinung, wobei die Verstärkung in diesem Zusammenhang nicht als vollwertige Ergänzung gilt. Noch weniger Beispiele findet man dafür, dass auch die Konjunktion des mit dem Hauptsatz verbundenen Nebensatzes in die Grammatikalisierung einbezogen wird, so dass das Ergebnis eine Konjunktionenverbindung wird (*jóllehet hogy*). Da die Grenze zwischen den einschränkend adversativen Sätzen und den Konzessivsätzen sehr verwischt ist, kann die als Quellbereich geltende Konstruktion: (22) und (23) möglicherweise sogar die grammatikalisierte Konjunktion, bzw. Konjunktionenverbindung enthalten. In den Beispielen (24) und (25) zeigt die Gliedsatzordnung — Gliedsatz mit *jóllehet (hogy)* an zweiter Stelle — den Abschluss des Prozesses, die Verfestigung der konjunktionalen Funktion an. Beispiel (26) zeigt, dass es auch Versuche einer morphologischen Reduktion gegeben hat, das Ergebnis jedoch nicht in den allgemeinen Gebrauch übergegangen ist.

Die Veränderungen im Zusammenhang mit *hiszen* 'da' erfolgten später (s. auch **4.**). Der Grammatikalisierungsprozess begann in der altungarischen Zeit gerade erst, sein Ende, das auch mit einer morphologischen Veränderung einherging, erfolgte in der nächsten Epoche.

(27) bÿnọsọkọn kÿ kọnÿọrwlz. *hÿzọm* welem nem nehezwlz 'der du dich der Sünder erbarmst, ich glaube, du bist mit mir nicht beschwert' (CzechK. 46)

(28) az en atyam ky ľőͤt legyen *hizem* hallottatok Legyen ez orzagnak wala wra 'wer mein Vater war, ich glaube, ihr habt es gehört, er war der Herr dieses Landes' (ÉrsK. 459)

(29) ẏewel velẃnk *hẏʒem* ẏob hogẏ egẏ nemʒethnek Izraelben legẏ attẏa es papẏa, honnem egẏ embernek 'komm mit uns, ich glaube ~ denn es ist besser, dass du in Israel der Vater und Priester eines Volkes seist als eines Menschen' (JordK. 348)

(30) iry ennekem mindenkor mikor ide yóuó embered uagion *hißem* meg erdemlem aßt tüled 'schreib mir immer, wenn du einen Mann hierher kommen läßt, ich glaube ~ denn ich verdiene das von dir' (1589: TLev. 25)

(31) ne faraßon annalis tóbel Ngod bennünket, holot yot uarnank inkab Ntul, *Hißem* sey en, se pedig az en Vram semmit ... nem uitettünk Ngod ellen 'gnädiger Herr, strapaziere uns nicht mit noch mehr, wo wir eher Gutes von Euch erwarten, da weder ich noch mein Mann ... etwas gegen den gnädigen Herrn getan haben' (1589:TLev. 29)

(32) vgy mondak az attya fyay myt haborittyatok *hyszem* ha ados marad anny marhaya hogy meg adhattyuk 'seine Verwandten sagten, was belästigt ihr ihn, denn wenn er auch etwas schuldig bleibt, hat er genug Besitz, dass wir es zurückzahlen können' (1568: SzT. 5:149)

(33) Miért mentek u.m. a' Templomb(a) *hiszen* nem kortsoma ház az 'Warum geht ihr in die Kirche, da sie doch keine Kneipe ist' (1747:SzT. 5:150)

Der Quellbereich der Veränderungen ist diejenige syntaktische Situation mit entsprechendem Kontext (s. auch weiter oben), in der sich an *hiszem* mit Hauptsatzwert ein Objektsatz ohne Konjunktion anschließt: (27) und (28). Das Fehlen der Konjunktion deutet unbedingt schon auf einen gewissen Betonungsverlust (des rahmensatzartigen Hauptsatzes, der ohnehin nur die Stellungnahme des Sprechers ausdrückt) hin. Beispiel (29) und (30) zeigen die Übergangsphase: beide Interpretationen passen in den Kontext, sowohl „hiszem azt, hogy“ 'ich glaube, dass' als auch „ugyanis, mert“ 'nämlich, weil'. In (31) und (32) kann man *hiszem* als Konjunktion des erklärenden Satzes betrachten. Die phonologische Veränderung erfolgte — wie es Beispiel (33) zeigt — erst sehr spät. (EWUng. belegt sie noch später, 1789.)

Es ist bemerkenswert, dass dieselben Veränderungen bei *talán* 'vielleicht', das einen ähnlichen Quellbereich hatte, bereits wesentlich früher erfolgten. Die Verzögerung läßt sich wahrscheinlich darauf zurückführen, dass der Hauptsatz *hiszem* zur Bezeichnung der Stellungnahme des Sprechers wesentlich geläufiger war als *találom* 'ich finde' (so wie heute!), das somit konserviert wurde, noch eher jedoch darauf, dass *mert* 'weil', das bis dahin den Platz des neuen grammatischen Elements im Sprachsystem innehatte, diesen auch weiterhin nicht verloren hat, denn man benutzt es auch heute genauso. In zahlreichen Belegen stehen die zwei Konjunktionen zusammen, das bis dahin übliche Element führt das neue gleichsam in seine Funktion ein. Dies gilt allgemein als häufiges Phänomen bei der Entstehung und Verfestigung gerade von beiordnenden Konjunktionen. Zum Beispiel: „Jo fiam ... ne haborogi uelem *mert hizem* ha az uristen ez uilagbol ki uezenis tietek lezen ez utanis" 'Lieber Sohn, streite nicht mit mir, denn wenn mich der Herrgott aus dieser Welt nimmt, wird es euch weiter bleiben' (1600 : SzT. 5 : 150). Entsprechend der Entwicklung *talán* > *tán* konnte auch *hiszem* zur Partikel werden — sowohl in seinen reduzierten Formen *hisz, iszen* usw. als auch in seiner vollständigen Form —, am ehesten nach Fragesätzen: „Michoda Iſten Papia? *Hißem* en vagyoc az Iſten Papia" 'Wessen Gottes Priester? Ich bin doch Gottes Priester!' (SztárIg. 41). (Zu den Veränderungsprozessen von *hiszen* s. auch Papp 1998 und Juhász 1992, 773.)

Im Altungarischen gab es Versuche, die Imperativformen des Verbs *ért* 'verstehen' (*értsed* 'verstehe, 2. P. Sg.', vereinzelt *értsen* 'er/sie/es verstehe') ähnlich wie *tudniillik* 'nämlich' und *azaz* 'das heißt' zur erläuternden Konjunktion zu entwickeln: „migh embo̊ͤr no̊ͤmo̊ͤſb: annal keduefb zolgalattia iſtennek elo̊ͤtte: *erćed* ha lelkebe es no̊ͤmo̊ͤs" 'je edler ein Mensch ist, desto lieber ist sein Dienst vor Gott: das heißt wenn er auch in seiner Seele edel ist' (TihK. 265). Obwohl *értsed* im Altungarischen auch bei der Verknüpfung von erläuternden Syntagmen vorkommt, was auf erfolgte Grammatikalisierung hinweist, wird es nur vereinzelt gebraucht und stirbt in den folgenden Epochen aus (Papp 1996).

**2.2.4. Abbruch des Austritts.** Die Grammatikalisierungsprozesse in den Satzgefügen konnten auch abbrechen, sozusagen im Grammatikalisierungskanal stecken bleiben. (Von Veränderungen, die mehr oder weniger abgeschlossen wurden, jedoch aus verschiedenen Gründen nicht in den allgemeinen Gebrauch übergingen, war bereits mehrmals die Rede.) Hier ist von solchen Fällen die Rede, in denen lediglich eine semantische Reduktion erfolgte — mit häufigem, bei einigen Typen sogar sehr häufigem Vorkommen der betreffenden Elemente im Hintergrund. Der Prozess setzte sich jedoch nicht fort, das Element trat nicht aus dem Rahmen des Satzgefüges heraus, es erfolgte kein Kategorienwechsel, kein Wortartwechsel und keine morphologische Reduktion. Auf dieser Stufe der semantischen Verblassung konnten im Altungarischen — aufgrund kommunikativer Bedürfnisse — sowohl Hauptsätze als auch Nebensätze stecken bleiben.

**2.2.4.1. Hauptsätze.** Ihre Nebensätze enthalten zumeist keine Konjunktion, sie selbst verlieren oft die vorangestellte Position und können in den Nebensatz eingefügt werden. Trotzdem erfolgt hieraus keine Grammatikalisierung zu einem der Verhältniswörter (mit modaler, pragmatischer oder grammatischer Bedeutung).

(34) vala kÿ ÿtalt adand egÿnek ... *Byzon mondom tÿnektek* nem veztÿ el hẅ erdemeet 'wer nur einem zu trinken gibt ... Wahrlich, ich sage euch, er verliert sein Verdienst nicht' (JordK. 385)

(35) Akkor azt mondom nekÿek: *Bÿzoń mondom tẃnektek* nem esmerlek tẃtǫketh 'Dann sage ich ihnen: Wahrlich, ich sage euch, ich kenne euch nicht' (ApMélt. 55)

(36) *kerlek* vram meg ne vtalÿ 'Bitte, Herr, verachte mich nicht' (CzechK. 44)

(37) khÿn *lathÿe ÿsthen* mÿnden oran bankodom 'worüber ich mich, Gott sieht es, immerfort gräme' (um 1527: KLev. 68.)

In (34) und (35) ist zu sehen, dass es sich hier um eine besondere Form des Zitierens handelt (1. P. Sg.), die in dieser Epoche und in diesem Kontext zudem auch gattungsabhängig war, da die semantische Erosion von der Gebrauchshäufigkeit der neutestamentlichen Bibelübersetzungen abhing. Die völlige Entleerung zeigt Beispiel (35). Es ist bemerkenswert, dass heute die Formen *aszondom* 'Ich sage(, dass)' und *aszongya* 'Er/sie sagt(, dass)' ebenso funktionslos benutzt werden. Bei Verben im Hauptsatz, die in die semantischen Kategorien von Mitteilung oder Wahrnehmung gehören, erfüllt die 1. P. Sg. eine spezifische pragmatische Funktion. Diese Hauptsätze sind grammatisch selbst als Rahmensätze schwach, hinsichtlich der Kommunikation aber (das „ich", die 1. P. Sg. im Mittelpunkt) sind sie wichtig und häufig, so dass sie leicht in den Grammatikalisierungskanal eintreten können. Dieses Kommunikationsbedürfnis, durch das sie bis dorthin geraten sind, ist aber in diesem Falle zugleich auch ein konservierender Faktor. So hat der Prozess hier — zumindest im Altungarischen — ein Ende, er geht nicht weiter.

**2.2.4.2.** Semantisch verblasste **Nebensätze** kamen im Altungarischen vor allem unter den Komparativsätzen in größerer Zahl vor: *mint látom* 'wie ich sehe', *mint ismerem* 'wie ich (+ Akk.) kenne', *mint alítom* 'wie ich meine', *miképpen*

*XY írja, mondja* 'wie XY schreibt, sagt', *miként írva vagyon* 'wie es geschrieben steht' usw. (Eine detailliertere Analyse s. bei Berrár 1960, 40–2.)

(38) es *amÿnth hallottuk* nagi haburusagot zenuettĕl 'und wie wir gehört haben, hast du einen großen Zwist erlitten' (KrisztL. 26)

(39) ez wylag nem wolth ewreke hanem ewtet Iſthen teremte, *mynt uirgilius meg yrta Es mynekwnk Irwa hattha* 'diese Welt war nicht von ewig, sondern die hat Gott geschaffen, wie es Vergil geschrieben und uns schriftlich hinterlassen hat' (ÉrsK. 487)

(40) altalÿaban nem neuezÿ meg az legenda helÿet · hanem chak zent egÿ haznak mongÿa · de *menere az legendanak folyasa targÿa* · az kar allyat mongÿa zent egyhaznak 'im allgemeinen bezeichnet die Legende den Ort nicht, sondern nennt ihn nur heilige Kirche, aber wie es im Verlauf der Legende gehalten wird, wird der Teil unter dem Chor heilige Kirche genannt' (MargL. 99)

(41) ennec meg ǫſmeretire, veġǫnc biʒonſagot *menere lehet* ʒent iraſnac ġǫkerebǫl 'um dies zu erkennen, sollten wir Gewissheit gewinnen soweit es geht aus dem Ursprung der Heiligen Schrift' (GuaryK. 32)

Der Typ als solcher ist sehr alt, er kommt schon in den frühesten ungarischen Sprachdenkmälern (Leichenrede, Königsberger Fragment) mehrmals vor. Die Nebensätze wurden, nachdem sie ihre tatsächliche Komparativfunktion verloren hatten, aus einem anderen Gesichtspunkt wichtig: sie dienten z. B. zur Betonung des gemeinsamen Wissenshintergrundes der Kommunikationspartner oder gaben an, mit welchen Einschränkungen das im Hauptsatz Gesagte gilt. Derartige kommunikativ-funktionelle Bedürfnisse können auch in diesem Fall das weitere Fortschreiten des Veränderungsprozesses verhindert haben.

## 2.3. Allgemeine Konsequenzen

Hinsichtlich der bisher untersuchten Grammatikalisierungsprozesse lassen sich folgende allgemeine Merkmale nennen:

- Der Übergang erfolgt von einer selbstständigeren Form, einer höheren sprachlichen Ebene zu einer niedrigeren sprachlichen Ebene: zusammengesetzter Satz → Lexem (oder lexikalisierte Form).
- Die Veränderung betrifft auf jeden Fall die inhaltliche Seite des Zeichens oder der Struktur, die morphologische nicht immer.
- Morphologische Veränderungen stehen im Zusammenhang mit dem Alter des Prozesses sowie mit der (zentraleren oder peripheren) Position des

neu entstandenen Elements im System. Die Formveränderungen (Morphologisierungen) sind für einen Großteil der in zusammengesetzten Sätzen entstandenen Elemente nicht charakteristisch.
- Der Wandel beginnt immer auf der inhaltlichen Seite, mit einer Bedeutungsänderung, bei zusammengesetzten Sätzen auf jeden Fall mit einer semantischen Reduktion, einer Bedeutungsverblassung, die durch die erodierende Wirkung häufigen Gebrauchs erfolgt.
- Das Kriterium des häufigen Gebrauchs in der Kommunikation bestimmt bereits in großen Zügen die Typen der Quellbereiche.
- Beim Zustandekommen des dem Beginn des Grammatikalisierungsprozesses entsprechenden Quellbereiches sind Kontext, Wortfolge sowie die begrifflichen Eigenschaften (Akzidenz) wichtig.
- Der Grammatikalisierungsprozess ist schwankend, er kann in verschiedenen sprachlichen Regionen Unterschiede aufweisen. Im Sprachsystem sind der Ausgangspunkt, das Endergebnis sowie die Übergangsformen gleichzeitig vorhanden. Der Quellbereich kann in seiner ursprünglichen Funktion auch weiterhin Teil des Sprachsystems bleiben (Polysemie).
- Der Grammatikalisierungsprozess kann auf verschiedenen Stufen zum Stillstand oder zum Abbruch kommen.

Die abstrakteren Grammatikalisierungsprozesse basieren auf kognitiven Vorgängen.[15] Diese haben auf die Entstehung des Systems der Satzgefüge starken Einfluss. Sie beweisen die Priorität der Raumorientierung sowie die sich daraus entwickelnde (zunehmend abstrakte) Richtung: → Zeit → Kausalität. Dieser Vorgang lässt sich bei der Entstehung des Systems der adverbialen Bestimmungen gut nachvollziehen. Die Ausdrucksmittel beweisen, dass ein Element, das bereits eine grammatische Bedeutung erworben hat — in unserem Falle eine Konjunktion —, zwecks Annahme einer abstrakteren Bedeutung weiter grammatikalisiert werden kann. Zum Beispiel *ha* 'wenn': Ort → Zeit → Bedingung; *holott* 'obwohl': Ort → Zeit → Konzession. Sicherlich ließen sich auch für die Grammatikalisierungsprozesse der zusammengesetzten Sätze sehr allgemeine Abläufe und Grammatikalisierungskanäle feststellen.

[15] Zu den metaphorischen und metonymischen Vorgängen, die sich bei der Grammatikalisierung abspielen, gibt es eine reichhaltige Fachliteratur. Kövecses (1998, 78) zeigt auf, dass die metaphorische Konzeptualisierung vermutlich auf universellen menschlichen Erfahrungen beruht. Vgl. auch Ladányi (1998, 410, 412).

## 3. Elliptische Prozesse

Der Auslöser der Veränderungen, die man unter dem Begriff **Ellipse** zusammenfassen kann, ist auf allen sprachlichen Ebenen die sprachliche Ökonomie. Innerhalb der zusammengesetzten Sätze sind zum Beispiel relevante und häufige Typen der **Relativsätze**, wie die betreffenden **Subjekt-** und **Objektsätze**, infolge einer Ellipse im Hauptsatz von ursprünglichen Attributivsätzen zustande gekommen: *Azt a bűnt megbocsátják, ki bűnt elkövettek.* 'Diejenige Sünde wird verziehen, welche Sünde begangen wurde.' → *Azt a bűnt megbocsátják, kit elkövettek.* 'Diejenige Sünde wird verziehen, welche begangen wurde.' → *Azt megbocsátják, kit elkövettek.* 'Das wird verziehen, was begangen wurde.'[16]

Durch Ellipse ist auch der **Absichtssatz** entstanden. Der Vorgang läßt sich — an einem Beispiel aus der Gegenwartssprache — folgendermaßen rekonstruieren: *Elutazott egy vidéki városba, és/mert azt akarta/kívánta, hogy találkozzék öreg tanárával.* 'Er reiste in eine Provinzstadt, und/weil er wollte/wünschte, dass er seinen alten Lehrer treffe.' → *Elutazott egy vidéki városba, hogy találkozzék öreg tanárával.* 'Er reiste in eine Provinzstadt, um seinen alten Lehrer zu treffen.'

Die Entstehung durch Ellipse — die Tilgung des mittleren Gliedsatzes — macht folgendes deutlich: Die Konjunktion der Absichtssätze ist das asemantische *hogy*. Den Imperativ (Konjunktiv) des Prädikats des Nebensatzes fordern die Grundglieder *akar* 'will', *kíván* 'wünscht', *szeretne* 'möchte', *óhajt* 'wünscht' des getilgten Gliedsatzes. Außerdem lässt sich nun die Identität des Korrelats sowie der Unterschied der Modusbenutzung von Kausalsätzen und Absichtssätzen erklären: *Azért utazott a vidéki városba, (mert azt akarta,) hogy találkozzék öreg tanárával.* 'Er reiste deshalb in die Provinzstadt, (weil er wollte,) dass er seinen alten Lehrer treffe.' ~ *Azért utazott a vidéki városba, mert találkozni akart öreg tanárával.* 'Er reiste deshalb in die Provinzstadt, weil er seinen alten Lehrer treffen wollte.' Der Typ des getilgten Gliedsatzes macht zugleich den Quellbereich für die Grammatikalisierung der auch zur Einleitung von Absichtssätzen gebräuchlichen Partikel *hadd* 'lass (+ Verb)' deutlich: *Ne zavard most a fiút, hagyd, hogy tanuljon.* 'Störe den Jungen jetzt nicht, lass (zu), dass er lerne.' → *Ne zavard most a fiút, hadd tanuljon.* 'Störe den Jungen jetzt nicht, lass ihn lernen.'

Die Ellipse hat einen erheblichen Einfluß auch auf die Struktur der **Komparativsätze**. Und zwar einen so großen, dass man die Konjunktion *mint* 'wie, als' in bestimmten Fällen schon als Präposition, als ein Element mit Suffixmorphem-

[16] Zur Entstehung der Attributivsätze s. Dömötör (1991, 742–4).

wert betrachtet (vgl. Keszler 2000b, 72). Im Ungarischen ist bei der Entstehung mehrerer zusammengesetzter komparativer Konjunktionen mit elliptischen Prozessen zu rechnen, auf die dann eine Klitisierung folgte (*mintha* 'als wenn, als ob', *miképpenha* 'als wenn, als ob', *hogynem* 'als (ungleich)', *hogysemmint* 'als (ungleich)' usw.). Die in der Komparation gebräuchlichen Begriffsverknüpfungen sowie die damit zusammenhängenden elliptischen Prozesse in Komparativsätzen behandelt Jolán Berrár in ihrer beispielhaften Monographie (1960), deren Erkenntnisse auf dem gesamten Kodexmaterial der altungarischen Zeit basieren.

## 4. Analogie

Das Streben nach der Symmetrie des Systems, die Analogie, hat das System der zusammengesetzten Sätze am Ende der altungarischen und am Anfang der mittelungarischen Zeit umgeformt. Hier handelt es sich um die Gruppen der Sätze mit **kausaler Beziehung**, die sich in dieser Epoche in unter- und beigeordnete Paare teilten. Die Veränderung begann mit der Entstehung der Konklusivsätze.

Der gleiche referentielle Gehalt bei Sätzen mit kausaler Beziehung konnte in zwei grammatisch verschiedenen Strukturen ausgedrückt werden, in untergeordneter und in beigeordneter Form.

Im Falle einer Beziehung Grund–Folge:

(a) In untergeordneter Form: mit der Reihenfolge Nebensatz–Hauptsatz: „*Myert istenth valÿa tarswl* nem gondol az embery nÿaÿassaggal“ 'Da er Gott zum Gefährten hat, denkt er nicht an die Freundlichkeit der Menschen' (WinklK. 129).

(b) Mit Beiordnung, in der aber die zwischen den Gliedsätzen bestehende logische Beziehung noch nicht durch eine spezielle Konjunktion angezeigt wurde: „*nalatoknal nagygyal erewſb vagyok* [∅] *nem artnak en ellenem valamyk kerben terewmnek*“ 'ich bin viel stärker als ihr [∅] mir schadet nicht, was im Garten wächst' (PéldK. 68); „*ƺ kèllètéc ọnèki ètanalʟ ƺ paƺanʟola mègalkotni amagaſſègọ kèƺeztet*“ 'und es gefiel ihm dieser Rat, und er befahl, das hohe Kreuz anzufertigen' (BécsiK. 61).

Im Falle einer Beziehung Folge–Grund:

(a) In untergeordneter Form: mit der Reihenfolge Hauptsatz–Nebensatz: „Azert zolok nekyk peldazerent *Mert lathwan nem lathnak · es halwan · nem halnak*“ 'Ich rede zu ihnen deshalb in Parabeln, denn sehend sehen sie nicht, und hörend hören sie nicht' (JordK. 393); „Harmadzer vala zent dorothea azzon tevkelletes zerelmev iſtenhez. *mert nagy ſok fele kenokat zenuede criſtuſnak zerelmeert*“ 'Zum dritten war die heilige Dorothea vollkommen in ihrer Liebe zu Gott, denn sie erlitt sehr viele verschiedene Qualen um der Liebe Christi willen' (CornK. 126r).

b) Mit Beiordnung, in der die logische Beziehung zwischen den Gliedsätzen durch eine Konjunktion noch nicht angezeigt wurde: „*Howa fwssak* [∅] *nýnchen wtam*“ 'Wohin soll ich laufen [∅] ich habe keinen Weg' (FestK. 371).

Die Position der Konjunktion in den unter- und beigeordneten Formen war bei der Beziehung Grund–Folge unterschiedlich, bei der Beziehung Folge–Grund identisch. Deshalb hat in der Gruppe Grund–Folge ein Differenzierungsprozess eingesetzt und ist die Entstehung der konklusiven Konjunktionen erfolgt, und zwar durch Grammatikalisierung aus Adverbien. In der Gruppe Folge–Grund mit identischer Position der Konjunktion ist die vorhandene Konjunktion *mert* 'weil', die aus einem Relativpronomen abgeleitet ist (also ursprünglich unterordnend war), bis heute auch in Sätzen mit einer lockereren kausalen Beziehung zur Konjunktionsfunktion geeignet. Die Grammatikalisierungsprozesse der speziellen Konjunktionen der erläuternden Sätze sind wesentlich späteren Datums als die der konklusiven. (Die Entstehung von *hiszen* 'da (ja)' wurde unter **2.2.3.** behandelt.) Bei der Entstehung der durch Konjunktion eingeleiteten erläuternden Sätze spielte — wegen des Fehlens wirklichen funktionalen Zwanges — das Streben des Systems nach der Symmetrie eine Rolle. Schon deshalb ist es bemerkenswert, dass sich im Deutschen etwa zur selben Zeit eine ähnliche Veränderung vollzog. In der Beschreibung der syntaktischen Veränderungen von 1470 bis 1650 heißt es: „Mit *wan* (< mhd. *wande*) konnten mhd. begründende Haupt- und Gliedsätze eingeleitet werden. Bei Luther setzte bereits eine Differenzierung derart ein, daß *denn* im Hauptsatz und *(die)weil* im Gliedsatz gebraucht wurde“ (Schildt 1976, 145). Ebenso erfolgte der Ausgleich in einer auch zur kausalen gehörenden anderen Gruppe: Zu den einschränkend adversativen Beiordnungen kamen — bei identischem Referenzgehalt — die Konzessivsätze hinzu. Eine ihrer Konjunktionen (*jóllehet* 'obgleich') wurde unter **2.2.3.** behandelt.[17]

## 5. Syntaktische Synonymie

Die Veränderungen, die bei den Satzgefügen die syntaktische Synonymie ausgelöst hat, sind von anderer Art als die bisher besprochenen. Sie sind in geringe-

[17] Über die Differenzierungsprozesse detaillierter bei Haader (1999).

rem Maße an der Veränderung des (Teil-) Systems beteiligt, werfen aber dafür in größerem Maße die komplizierte Frage nach der Beziehung zwischen Sprache und Stil auf. Die syntaktische Synonymie (vgl. Kiss 1993; Károly 1980, 46) ist aus der Sicht des Sprechers eine Wahl zwischen solchen Strukturen, die füreinander als funktionale Varianten erscheinen. Die Möglichkeit der Wahl wird dadurch gegeben, dass in den synonymen Strukturen das Identische und das Unterschiedliche gleichzeitig vorhanden ist: nahezu Identisches im Bereich der Referenz (Inhalt), Unterschiedliches in der sprachlichen Formulierung, auf der Ebene der Präsentation (Form). Die Formen aber, unter denen man wählen kann, gehören — zumindest im Falle der zusammengesetzten Sätze — miteinander verbundenen Bereichen des Systems an. Die Wahl zwischen den Strukturen ist nicht unabhängig vom Zweck der Mitteilung.[18] Um aber aufgrund des unterschiedlichen Gebrauchs von synonymen Strukturen auf eine sprachliche Veränderung schließen zu können, ist auch eine statistische Bestätigung erforderlich. Da der Variationsbedarf in der Syntax — im Vergleich zu den niedrigeren sprachlichen Ebenen — sehr groß ist, kann die Wahl auch einfach eine Frage des Stils sein, die dann keine Auswirkung auf das System hat, dieses nicht verändert.

**5.1.** Als synonyme Strukturen, funktionale Varianten kann man in der Syntax die **Partizipialkonstruktionen** und die **Nebensätze** betrachten. Hinsichtlich der Referenz haben sie identische Fähigkeiten: Die Partizipien als Übergangswortarten können auf dieselbe Art ergänzt werden wie die Verben. In der Präsentation sind sie aber unterschiedlich: Ein Nebensatz ist wesentlich redundanter, lockerer. Die Tatsache, dass die Konstruktionsweise mit Nebensätzen ihre funktionale Variante, die Partizipialkonstruktion, in der altungarischen Zeit (und auch später noch) in zunehmendem Maße verdrängte, entspricht der allgemeinen synthetisch → analytischen Tendenz der sprachlichen Veränderungen.

Ein ideales Feld für die Untersuchung der Wahl zwischen funktionalen Varianten sind die aus allen Epochen der Sprachgeschichte (reichlich) belegbaren Bibelübersetzungen. Die referentielle Identität ist hier durch den zu übersetzenden Text, durch dessen sakralen und stark gebundenen Charakter gewährleistet, die Präsentation zeigt die sprachliche Wahl des gesellschaftlich (soziokulturell) und sprachlich in die jeweilige Epoche eingebetteten Übersetzers.[19]

[18] Bei entsprechend weit gefasster Interpretation lässt sich hier einiges einordnen, so z. B. der emotionale Aspekt der Sprache (vgl. Péter 1991) oder ein Streben nach Redundanz, welchen Grund dies auch haben mag (Herman 1967) usw.

[19] „Die mehrfache, zeitlich und geographisch abweichende Überlieferung desselben Textes eignet sich zur Untersuchung sich ablösender Formen und Konstruktionen“ (Ebert

Die parallelen Bibelübersetzungen zeigen, dass die Partizipialkonstruktionen der frühen Kodizes später (schon in den späteren Kodizes, vor allem aber in den mittelungarischen Übersetzungen wie Pesti und Sylvester) durch Nebensatzkonstruktionen ersetzt werden. Dies bedeutet zugleich eine größere Zahl von Gliedsätzen und wirkt sich auch auf die Makrostruktur des Gesamtsatzes aus. Zum Beispiel: „*Meg ọ è bèʒellèttè* im èliọuọ Iudas a· tiʒènkèttọ kọʒʒọl eg ʒ ọ vèlè ſoc gọlèkeʒèt *tọrọckèl ʒ rudackal / èʒèʒtettèc a· papi fèdèlmectọl / ʒ a· nepecn^c vènitọl*“ 'Während er noch dies sagte, kam Judas, einer der Zwölf, und mit ihm eine große Menge mit Schwertern und Knüppeln, geschickt von den Priesterfürsten und den Vorstehern des Volkes'. Mt. 26 : 47 ist also im MünchK. (33ra–33rb) ein einziger Satz mit zwei mehrfach ergänzten Partizipialkonstruktionen. Derselbe Vers besteht bei Sylvester aus sechs Gliedsätzen (die Schrägstriche bezeichnen nicht die Gliedsatzgrenzen, sondern sind Sylvesters eigenes Gliederungszeichen): „*Męg mikoronn ezt mondanā* / imę az Iudās *ki az tizenkēt tanÿtuānnak eǵgik vala* / eliuta / *ęs ů uele naǵ ſereg nip vala mell ſereg nip fel kißůlt vala tőrőkuel ęs fabotokual / ęs mell ſereg boczāttatott vala az papoknak feiedelmitůl / ęs az nipeknek vinitůl*“ 'Noch als er dies sagte, siehe Judas, der einer der zwölf Jünger war, kam zu ihm, und mit ihm eine große Schar Volkes, welche Schar Volkes ausgerüstet war mit Schwertern und Knüppeln, und welche Schar geschickt war von den Fürsten der Priester und den Vorstehern des Volkes' (Sylvester 43a). Wir wissen zwar nicht genau, weshalb Sylvester so extrem die Nebensatzkonstruktion bevorzugt, aber da er in seinem Neuen Testament auch an anderen Stellen sehr weitschweifig übersetzt und wir seinen soziokulturellen Hintergrund kennen, ist mit großer Wahrscheinlichkeit anzunehmen, dass er zu Beginn der Reformationszeit damit zu einer möglichst genauen und detaillierten Kenntnis der Bibel in der Muttersprache beitragen wollte.

Ebenso verhält es sich bei Infinitivkonstruktionen: „mert lattvk v́ ʟillagat napkeleten es iọttọnk *imadnia ọtọt*“ 'Weil wir seinen Stern im Osten gesehen haben, und wir kamen ihn anzubeten' (DöbrK. 279; dieselbe Lösung findet sich auch im MünchK. und JordK.). Pesti gab diese Stelle im Jahre 1536 schon durch einen Absichtssatz wieder: „mert latok az ew chÿllagat napkelet felewl, ees iewttewnk *hogÿ imagÿwk ewtet*“ 'Weil wir seinen Stern von Osten gesehen haben, und wir sind gekommen, um ihn anzubeten' (Pesti 2b). Ebenso mit einem Nebensatz ist es in Sylvesters und Károlyis Übersetzung sowie in der heutigen protestantischen und katholischen Bibelübersetzung (1975 und 1976) zu lesen. Der sich ans Lateinische haltende, konservative, aber in sei-

1978, 6). Die Veränderungen, die mit den verschiedenen Sprachgebieten in Zusammenhang gebracht werden können, werden hier nicht behandelt.

nen sprachlichen Lösungen hervorragende und konsequente Káldi entscheidet sich erneut für die synthetischen Lösungen, in diesem Fall für die Infinitivkonstruktion, bevorzugt aber auch im allgemeinen die Partizipialkonstruktionen. Seine Entscheidung und Übersetzerhaltung ist — wiederum in Kenntnis seiner soziokulturellen, gesellschaftlichen und religiösen Stellung — gut zu verstehen. Untersucht man eine entsprechende Anzahl von Versen in Bibelübersetzungen aus verschiedenen Epochen, so zeichnen sich anhand der Übereinstimmungen und der Unterschiede in der Wahl zwischen den synonymen Strukturen die Regelmäßigkeiten in der Nachahmung der Vorbilder ab, die überwiegend von religiöser Zugehörigkeit und der Entstehungszeit abhängig sind. Die Synonymie von Partizipial- und Nebensatzkonstruktionen ist außer in den Bibelübersetzungen auch in den parallelen Texten der Legendarien recht häufig: „Attyam hallak *tegedett zolnÿ es mondanÿ*“ 'Vater, ich höre dich sprechen und sagen' (JókK. 45) ~ „Atÿam halotam *hogÿ zoltal es vgÿ montal*“ 'Vater, ich habe gehört, dass du sprachest und sagtest' (VirgK. 43).

**5.2.** Eine Wahl zwischen synonymen Strukturen findet sich in den Bibelübersetzungen auch in vielen anderen Fällen, diese hatten aber keine Auswirkungen auf die Veränderung der Sprache, sondern zeigen vielmehr, welche Möglichkeiten bestehen, einen Typ durch einen anderen zu ersetzen. Als solche zeigen sich zum Beispiel kopulative Beiordnung und Absichtssatz; oder — um im Rahmen der Unterordnungen zu bleiben — die Attributsätze, die asemantischen Adverbialsätze und die Absichtssätze. In anderen Fällen weist die Wahl zwischen den Satzstrukturen auf die Schwierigkeiten hin, die der Übersetzer mit dem zu übersetzenden Text hatte. In den hier folgenden Beispielen resultieren die verschiedenen syntaktischen Lösungen daraus, dass der zu übersetzende Inhalt (eine umgekehrte Kausalität, also die Tilgung einer Erwartung) und ein noch nicht vollständig herausgebildeter Satztyp, der Konzessivsatz, schwer zueinander finden. Der Text der Vulgata (Joh. 11, 6) lautet: „ut ergo audivit quia infirmabatur, tunc quidem mansit in eodem loco duobus diebus.“ Die Lösungen der Übersetzer: „aʒeꝛt hog hallotta meꝛt bètegluala ***biʒoń*** *lakoʒec aʒon hèl'bē kèt napon*“ 'Deshalb, dass er hörte, dass er krank war, wahrlich blieb er an jenem Ort an zwei Tagen' (MünchK. 97ra); „hoǵ azert halla hoǵ beteg · ***tahat*** *meg marada azon helben · ket napoth*“ 'Als er deshalb hörte, dass er krank ist, also blieb er noch zwei Tage an jenem Ort' (DöbrK. 487); „Mÿnt aʒert hallotta vona hogÿ betegleneek/ ***ÿollehet akkoron*** *marada· megh aʒon helÿen ket napÿglan*“ 'Als er deshalb hörte, dass er krank sei, da blieb er zwar noch zwei Tage lang an jenem Ort' (JordK. 665); „Aʒert mÿkoron meg halla hogÿ beteg wolna, ***Iol lehet aʒ idewbe***, *wgÿan azon helÿẽ marada keet napÿg*“

'Deshalb als er hörte, dass er krank sei, zwar in der Zeit, blieb er zwei Tage an demselben Ort' (Pesti 210b); „Mikor meg hallotta vólna azért hogy az (Lázár) beteg, ***ackor noha*** *kęt nap marada ott à helyben az hól vala*" 'Als er deshalb hörte, dass er krank ist, dann obwohl blieb er zwei Tage an dem Ort, an dem er war' (Károlyi 93a).

Die syntaktische Synonymie brachte also langsame Veränderungen in den zusammengesetzten Sätzen zustande, wo nicht eine aussterbende Form durch eine andere ersetzt wird, sondern zwei Formen nebeneinander existieren, was eine Verschiebung der Nuancen bewirkt. Der Untersuchung dieses Phänomens sollte man mehr Aufmerksamkeit widmen als bisher, da sich außer den im Sprachsystem begründeten Möglichkeiten und Regeln der Wahl zwischen den Strukturen oft auch die Motivationen der Wahl feststellen lassen.[20]

## 6. Ausblick

Die hier genannten, die Veränderungen der zusammengesetzten Sätze bestimmenden Wirkkräfte kann man natürlich nicht streng voneinander trennen. Bei den einzelnen sprachlichen Veränderungen erscheint jeweils die eine oder die andere als vorherrschend. Aber die hier analysierten Daten beweisen, dass Ellipse und Grammatikalisierung, Analogie und syntaktische Synonymie usw. die sprachlichen Veränderungen gemeinsam zustande bringen — so wie die Muster auf der Vorderseite des gewebten Stoffes ineinander übergehen.

Die von Lüdtke als Möglichkeit bezeichneten sprachlichen Veränderungen (vgl. Lüdtke 1980, 19) dürften in den verschiedenen Sprachen, oder zumindest in einem beträchtlichen Teil von ihnen, von ähnlichen Ausgangspunkten und mittels ähnlicher Prozesse erfolgt sein (vgl. auch Ladányi 1998, 411). Auch bei einem ganz oberflächlichen Vergleich z. B. mit dem Deutschen, zeigen sich sowohl Gemeinsamkeiten als auch Unterschiede. Im Zuge der Grammatikalisierung der Nebensätze spielten auch hier bei der Entstehung der freien grammatischen Morpheme mit Konjunktionsfunktion die Pronomina die entscheidende Rolle. Der Grammatikalisierungsprozess des deutschen Satztyps mit der Konjunktion *dass* (entsprechend dem ungarischen *hogy*) wird jedoch anders beschrieben als der für das Ungarische rekonstruierte. Er wird aus einer Beiordnung abgeleitet, mit Umdeutung **Demonstrativ**pronomen → Konjunktion und mit Verschiebung der Gliedsatzgrenze: *ich weiß* ***das****: er kommt → ich weiß,* ***dass*** *er kommt* (Ebert 1978, 26; Schweikle 1996, 258). Für die Entstehung des

[20] Vgl. Károly (1972, 124–6) zu den Möglichkeiten des Ausdrucks der passiven Beziehung.

Relativsatzes zeigt Ebert zwei Wege auf. Bei dem einen erfolgte die Grammatikalisierung eines Demonstrativpronomens, bei dem anderen die eines Interrogativpronomens[21] (a. a. O. 24–5). Letzteres entspräche dem Prozess, den man für das Ungarische gewöhnlich rekonstruiert. Das Phänomen, dass Partizipialkonstruktionen durch Nebensatzstrukturen ersetzt werden, ist aus zahlreichen Sprachen, so auch aus dem Deutschen, bekannt (Ebert a. a. O. 29). Einige der weniger zentralen Erscheinungen: Es ist anzunehmen, dass die mit *dass* ~ *hogy* gebildeten Konjunktionen — *kaum dass, nur dass, so dass* ~ *alighogy, csakhogy, úgyhogy* usw. — infolge ähnlicher Veränderungen zustande gekommen sind (Ebert a. a. O. 28). Von der Ähnlichkeit der auf Analogie basierenden Spaltung der Kausalsätze und der erläuternden Sätze, die in beiden Sprachen etwa zur selben Zeit erfolgte, war oben schon die Rede (s. **4.**).

Auch dies zeigt, dass man eine detaillierte allgemeine Syntaxgeschichte benötigt, deren Feststellungen aber durch gründliches Beweismaterial untermauert sein müssten.

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[21] Die Richtigkeit dieser Rekonstruktion bezweifelt Cser (2000, 69–70). Er argumentiert damit, dass eine unterordnende Konjunktion, die die Form eines Interrogativ- oder eines Demonstrativpronomens aufweist, nicht zwingend aus der betreffenden Struktur entstanden sein muss, „da ein Wort seine verschiedenen Eigenschaften auch ohne Berücksichtigung des Kontextes ändern kann“ (a. a. O. 70). Diese Feststellung, d. h. der Ausschluss des Kontextes aus dem Prozess der Veränderung, erscheint mir — insbesondere in bezug auf die Verhältniswörter — nicht unproblematisch.

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# ZUR WANDLUNG DES SYSTEMS DER KURZEN VOKALE DES UNGARISCHEN IN DER URUNGARISCHEN UND DER ALTUNGARISCHEN ZEIT

ATTILA HEGEDŰS

## Auszug

Als Ausgangspunkt der Wandlung der kurzen Vokale des Ungarischen in der altungarischen Zeit bezeichnet István Kenesei die Entwicklung des $\underset{\smile}{i}$ in zwei Richtungen ($\underset{\smile}{i} > u$, $\underset{\smile}{i} > i$), wo die Entwicklung das ganze Kurzvokalsystem veränderte. Nach der Kritik des Keneseis Modells versucht der Autor auf der Traditionen der Literatur zur ungarischen Lautgeschichte ein anderes Modell aufzustellen. Die Grundlage für diese Betrachtungsweise liefern die Betonungsverhältnisse des Ungarischen, und ihre Grundthese besagt, dass *a* und *ö* zu Beginn der altungarischen Zeit bereits existierten. In der urungarischen Zeit kam eine Verstärkung in Wörtern finnougrischen Ursprung mit den Stammlauten *u* und *ü* infolge der Betonung zustande, die mit einer Öffnung einherging. In unbetonten Silben dagegen erfolgte in der urungarischen Zeit eine Schwächung, die mit einer Reduktion am Wortende einherging (Schließung) und von einer Labialisierung begleitet war. Aufgrund dieses Modells kann man von einer Art Überkreuzwirkung sprechen, da in den betonten und in den unbetonten Silben jeweils entgegengesetzte Entwicklungen vonstatten gingen, deren Ergebnisse dann auf die Silben in der jeweils anderen Position gewirkt haben.

Die ungarische Lautgeschichte hat die Verschiebungen der kurzen Vokale, die sich in der urungarischen und der altungarischen Zeit vollzogen haben, mit ziemlicher Sicherheit erschlossen. Aufgrund ihrer Ergebnisse (Losonczi 1915–1917; Laziczius 1941–1943; Kubínyi 1958; Abaffy 1974, zusammenfassend Bárczi 1967) waren die wichtigsten Veränderungen: die Schließung der Stammendlaute, die Reduktion am Wortende, die damit zusammenhängende Labialisierung, der Wegfall der Stammendvokale und die so genannte Ersatzdehnung. Diese Prozesse sowie eventuelle weitere (Abaffy 1974, 431) sind keine individuellen Entwicklungen, sondern hängen durchaus zusammen. Dennoch ergibt sich selbst aus der wohl umfassendsten Synthese (Bárczi 1967) kein Prozess, der das gesamte System verändert und eine klar erkennbare Tendenz verkörpert. Gab es einen Grund für die Verschiebungen, den man erschließen kann? Und wenn ja, könnte dies die von Kubínyi vertretene Beschleunigung des Sprechtempos, die Auflösung der Intonationsrelationen gewesen sein? Lässt sich eine Tendenz feststellen, und kann man diese nach László Deme (1968, 18) als „Lockerung“ oder nach Loránd Benkő (1988, 149) als „akustische Schwächung“ bezeichnen, kann man auf dieses Phänomen die von Erzsébet Abaffy (1991, 29) bezüglich der Konsonanten formulierte „Schwächung“ anwenden? Lässt sich die Öffnung, die sich in der altungarischen Zeit vollzogen hat und das gesamte System der kurzen Vokale betraf, in diesen Prozess einordnen, und wenn ja: wie? Es lohnt sich, diese Fragen immer wieder zu stellen, da eine wirklich befriedigende Gesamtdarstellung der systematischen Veränderung ungeachtet der zahlreichen Einzelbeobachtungen immer noch fehlt.

Eben deshalb wirkte das erstmals 1984 in *A nyelv és a nyelvek* [Die Sprache und die Sprachen] (Kenesei 1989, 172–76) publizierte Wandlungsmodell als Neuheit. Demnach hat die zu Beginn der altungarischen Zeit erfolgte Entwicklung des *i̯* in zwei Richtungen (*i̯* > *u*, *i̯* > *i*) eine Serie von Verschiebungen im gesamten System ausgelöst. Aus *i̯* entstandenes *u* und *i* müssen Homonymien mit den ursprünglicheren *u*-s und *i*-s hervorgebracht haben, zu deren Beseitigung dann eine Verschiebung dieser ursprünglicheren *u*-s und *i*-s erfolgte: *i* wurde zu *ü* bzw. *ë*, und *u* wurde zu *o*. Dies löste selbstverständlich weitere Veränderungen der ursprünglicheren *o*-s, *ë*-s und *ü*-s aus. Und so weiter. Am Ende dieser Verschiebung „wird das System insgesamt modifiziert, wobei es jedoch seinen Systemcharakter bewahrt“ (176). Ein Laut (*i̯*) geht verloren, und ein neuer Laut entsteht (bzw. zwei neue Laute entstehen): das *ö* (und das *a*, bei dessen Herausbildung auch die Labialisierung *á* > *a* eine Rolle gespielt hat). Keneseis Verdienst besteht darin, dass er den systematischen Charakter der Entwicklung aufgezeigt hat, deren Hauptmotiv seiner Meinung nach das Bestreben darstellte, Homonymien zu vermeiden. István Kenesei hat das zunächst in einer populäreren Variante veröffentlichte Modell auch in einer wissenschaftlichen Mitteilung dargelegt (1995), die auch das Beweismaterial enthält. Dort betont er, dass das Hauptmotiv für die Lautverschiebungen die Bewahrung eines minimalen phonematischen Kontrasts war. Zur Untermauerung seiner Behauptungen führt er folgende Beispiele an: *szim* 'szem – Auge' und *szim* 'szív – saugen', *visz* 'visz – tragen' und *visz* 'vissza – zurück', *bics* 'becs(ül) – Wert (wertschätzen)' und *bics(ak)* 'Messer'. Außerdem skizziert er eine zeitliche Abfolge der Lautveränderungen mit 10 Stufen, die er zeitlich abgrenzt und 3 Perioden zuordnet. Der ersten Periode ordnet er die Entwicklung *i̯* > *i* und *i̯* > *u* zu (die im 12. Jahrhundert abschließt), der zweiten die Verschiebung *i* > *ë*, *i* > *ü* und *u* > *o* (die im 13. Jahrhundert abschließt) und die Verschiebung *á* > *a* (die im 14. Jahrhundert endet), und schließlich der dritten die Veränderung *ë* > *ö*, *ü* > *ö* und *o* > *a* (wobei er zu der Entwicklung *ë* > *e* keine Stellung bezieht).

Aufgrund der systematischen Betrachtungsweise der Entwicklung der Vokale, der Erklärung der Entwicklung mit dem Bestreben nach der Vermeidung von Homonymien, weiterhin aufgrund der Tatsache, dass er die Bedeutung der trotz der Probleme hinsichtlich der Lesarten zweifelsfrei erkennbaren Öffnung in der altungarischen Zeit für die systematische Entwicklung erkannt hat, ist Keneseis Modell auf jeden Fall als eine wertvolle und nicht zu umgehende Erklärungsmöglichkeit zu bewerten. Doch auch diese äußerst gefällige Theorie wirft diverse Fragen auf. Die erste ist die nach der Position des *i̯* im ungarischen Lautsystem. Dieser Laut war nämlich ein sehr seltenes Phonem (Benkő 1988, 156). Somit ist es schwer vorstellbar, dass ein so peripheres Phonem eine Wandlung dieser Größenordnung ausgelöst haben könnte. Ein weiteres Problem besteht darin, dass die Wandlung eines Lautes, der im Ergebnis mit einem bereits vorhandenen zusammenfällt, letzteren nicht unbedingt verdrängt und ebenfalls zur Wandlung zwingt. Hier ein Gegenbeispiel: Neben dem aus der finnougrischen Basissprache ererbten *w* entwickelte sich in der ersten Hälfte der urungarischen Zeit aus intervokalischem *m* ebenfalls *w*. Hier kann keine Rede davon sein, dass sich das bereits früher vorhandene *w* weiterentwickelte und das aus dem *m* entstandene bestehen blieb; im Gegenteil, sie haben sich auf identische Weise weiterentwickelt (vgl. Bereczki 1998, 71, 75). Und schließlich enthält die Theorie keine Ausführungen darüber, ob die betonte oder unbetonte Position die Art und den zeitlichen Ablauf der Veränderung beeinflusst hat.

Über die allgemeinen Vorbehalte hinausgehend kann man auch den Details nicht in allem zustimmen. Die erste Angabe für *szív* (∼ *szim*) stammt von 1456, ganz zu schweigen von *szimatol* 'schnüffeln' (1777). Zudem findet sich laut TESz. in den finnougrischen Formen von *szív* eher ein *p*, und da die Entwicklung *-p-* > *-w-* wahrscheinlich in der frühen urungarischen Zeit einsetzte, wurde dieses Verb am Ende der Periode vermutlich bereits mit *w* gesprochen, weshalb die Möglichkeit einer Homonymie mit dem Nomen *szim* 'Auge' schwer vorstellbar ist. Auch im Fall von *vissza* ist die Belegung problematisch, da die erste Angabe von 1337 stammt. Am gewagtesten ist die Gegenüberstellung von *becsül* und *bicsak*. Beide sind nicht vor dem 15. Jahrhundert zu belegen, und der von Kenesei angenommene Stamm *bics-* für *becsül* lässt sich nirgendwo belegen. Die Herkunft von *bicsak* ist umstritten; wenn man von der italienischen Herkunft ausgeht, ist das *i* des Wortes palatal, im Falle der türkischen Herkunft liegt das Problem in dem späten Zeitpunkt des ersten Vorkommens. Diese drei Beispielpaare können also nur mit großem Wohlwollen als Homonyme einer für die Zeit vor dem 12. Jahrhundert angenommenen Synchronie angesehen werden.

Überhaupt ist es problematisch, das Ende des Wandels *i̯* > *i* im 12. Jahrhundert anzusiedeln, da die in der „Grabrede“ (HB) vorkommende Form *achsin* 'Frau' sowie die in der „Grabrede und Fürbitte“ (HBK) vorkommende Form *homus* 'falsch', außerdem das von 1237 belegte *Ohzynfolua* das Vorkommen des *i̯* im 13. Jahrhundert belegen (vgl. Benkő 1980, 116). Ähnlich verhält es sich mit der rumänischen Form *Ciuc* (sprich: Tschuk) des Ortsnamens *Csik*, die laut Bárczi (1967, 144) frühestens aus dem 12. Jahrhundert stammen kann, während Benkő (1990, 122) eine noch spätere Übernahme als gesichert ansieht. Es finden sich noch weitere Beispiele bei Kenesei, die schwer zu akzeptieren sind, so z. B. *bükk* 'Buche' für den Wandel *i* > *ü*, dessen erste Form, die mit Sicherheit labial war, von 1419 stammt (OklSz., TESz.), oder für die Verschiebung *ë* > *ö* das Wort *fő* 'Haupt', das nur diphthongisch gewesen sein kann.

Kenesei datiert die Verschiebung *o* > *a* auf das 13–14. Jahrhundert, Bárczi (1955, 211–13) hingegen beweist mit Hilfe der bei Konstantin vorkommenden Formen des Namens *Taksony* die Existenz des labialen *a* im 10. Jahrhundert. Mit dem 13–14. Jahrhundert datiert Kenesei diese Entwicklung also mit Sicherheit zu spät (um so mehr, als sie auch in der von ihm als Quelle angegebene Bárczi-Zusammenfassung [1967, 179] auf das 10–14. Jahrhundert angesetzt wird, und nicht, wie in Keneseis Tabelle 3, auf das 13–14. Jahrhundert). Kenesei nimmt nicht nur für die Verschiebung *o* > *a* das 13. Jahrhundert als frühestmöglichen Zeitpunkt an, sondern auch für das Auftreten des *ö*. Im Gegensatz dazu ist gesichert, dass die Verschiebung *o* > *a* bereits im 10. Jahrhundert und das *ö* mit Sicherheit schon im 12. Jahrhundert existierte (vgl. Benkő 1980, 112–6). Im Spiegel der Kritik geraten die geordneten Zeitbestimmungen von Keneseis Tabelle 3 also ordentlich durcheinander. Um nur auf die beiden Endpunkte einzugehen: Das die Veränderung auslösende *i̯* war im 12. Jahrhundert noch vorhanden, und die zum Abschluss des angenommenen Prozesses entstehenden Laute *a* und *ö* existierten zu dieser Zeit bereits. Somit lässt sich beim besten Willen keine geradlinige Entwicklung skizzieren, in der das *i̯* der Ausgangspunkt und *a* und *ö* die Endpunkte wären. Gegen eine derartige geradlinige Entwicklung spricht auch die allgemein bekannte Tatsache, dass die Sprache der altungarischen Zeit lediglich als eine mehr oder weniger lockere Einheit von Dialekten zu betrachten ist, in denen einzelne Entwicklungen je nach Dialekt unterschiedlich zur Geltung kamen.

Im Folgenden versuche ich, eine andere Möglichkeit aufzuzeigen, die im Wesentlichen auf den Traditionen der Literatur zur ungarischen Lautgeschichte basiert und nur die Akzente etwas anders setzt: Sie löst sich von der Konzentration der Entwicklung der Vokale auf die altungarische Zeit und verschiebt die Ursprünge der Entwicklung zur urungarischen Zeit hin. Die Grundlage für diese Betrachtungsweise liefern die Betonungsverhältnisse des Ungarischen (vgl. Losonczi 1915–1917, 406), und ihre Grundthese besagt, dass *a* und *ö* zu Beginn der altungarischen Zeit bereits existierten. Dies versuche ich nun plausibel zu machen.

Die Meinungen darüber, ob das *a* in der urungarischen Zeit (eventuell in der finnougrischen Grundsprache) bereits vorhanden war, gehen auseinander. Das von Steinitz für die finnougrische Grundsprache erschlossene Vokalsystem beinhaltet den labialen Velaren tiefer Zungenlage (Bereczki 1998, 38). Auch Gulya (1967) behauptet, das labiale *a* sei in der ugrischen Grundsprache vorhanden gewesen. Wenn man sich von den mit *h* beginnenden Einträgen des MSzFE. die Wörter *hab* 'Schaum', *had* 'Heer', *haj* 'Haar', *hal* 'sterben', *hamu* 'Asche', *harag* 'Zorn', *három* 'drei', *hat* 'sechs' und *ház* 'Haus' ansieht, so zeigt sich mit Ausnahme von *haj* bei allen *o* oder *u* als Stammvokal in der grundsprachlichen Form. Die regelmäßige Entwicklung *u* > *o* > *a* ist eine Öffnung, und diese ist mit der betonten Position des Stammvokals zu erklären. Die frühesten ungarischen Angaben für diese Wörter weisen jedoch (mit Ausnahme von *hab, három* und *ház*) das Graphem *o* auf. Dieses *o* kann man als *a* lesen (Benkő 1980, 91–1, 110), keinesfalls aber als *ȧ*. Die ersten Angaben für *három* und *ház* jedoch enthalten den Buchstaben *a* (*hab* ist erst sehr spät belegt, deshalb kann es hier nicht berücksichtigt werden), den man als *a* oder *ȧ* lesen kann. Die Öffnung in ungarischen Wörtern finnougrischer Herkunft, deren Stammvokal auf *u* (*o*) zurückzuführen ist, hatte also zu Beginn der altungarischen Zeit *a* oder *ȧ* zum Ergebnis. (Selbstverständlich kann sich das *a* in bestimmten Positionen, schon allein aufgrund der großen Zahl der Laute *ȧ* und *á* in dieser Periode, zu *ȧ* weiter entwickelt haben — vgl. z. B. im Fall von *hal* Benkő 1980, 109). Für die Labialisierung des illabialen Velars in Wörtern, die ursprünglich ein *ȧ* enthielten, kann man sich hingegen Benkős Feststellung anschließen, dass nämlich diese Entwicklung vielleicht schon am Ende der urungarischen Zeit, mit Sicherheit aber ganz zu Beginn der altungarischen Zeit vonstatten ging (Benkő 1980, 107). Meine Schlussfolgerung lautet: Das *a* existierte zu Beginn der altungarischen Zeit als Weiterentwicklung sowohl von *o* als auch von *ȧ*. Auch András Róna-Tas datiert die Entstehung des *a* auf die urungarische Zeit, wobei er es für bemerkenswert hält, dass sich in der mittleren bzw. unteren Wolgaregion die frühe Labialisierung des illabialen *ȧ* im Türkischen nachweisen lässt, was sich aufgrund der arealen Berührungen auch auf die Entwicklung des ungarischen Vokalsystems ausgewirkt haben kann (Róna-Tas 1997, 55–6).

Problematischer scheint die Belegung des Vorhandenseins des *ö* zu Beginn der altungarischen Zeit, da die Tradition der ungarischen Sprachgeschichte (und vor allem Bárczis Zusammenfassung — 1967, 178–9) quasi zum Dogma erstarrt ist. Sie besagt, dass das *ö* zu Beginn dieser Periode fehlte, frühestens im 13. Jahrhundert auftrat, seine Entwicklung jedoch erst im 16. Jahrhundert abgeschlossen war. Im Gegensatz dazu ist das *ü* — und wenn auch nur als Variante — bereits für die finnougrische Grundsprache mit Wahrscheinlichkeit anzunehmen (Bereczki 1998, 40, 78). Wo es aber *ü* gibt, da provoziert es geradezu die Entstehung von *ö* (Benkő 1988, 156). Benkő liest die Buchstaben *u, w, v*, die in den schriflichen Angaben des 12. Jahrhunderts vorkommen, oft als einen *ö*-Laut (1980, 112). Beispiele dafür sind *köz* 'Gasse' und *könny* 'Träne'. Diese sind nämlich auf den Stammvokal $i \sim ü$ zurückzuführen, und aufgrund der ungarischen Intonationsverhältnisse ist die Öffnung des Vokals der betonten Silbe — ebenso wie beim *a* — auch hier mit Wahrscheinlichkeit anzunehmen.

Ich bin jedoch — anders als Benkő — der Meinung, dass bei einigen seiner Beispiele für den Buchstaben *e* ebenfalls ein *ö* anzunehmen ist. In der Literatur zur Geschichte der ungarischen Rechtschreibung wird weitgehend die Auffassung vertreten, dass *e* nicht als *ö* gelesen werden kann. Um diese These als gültig beibehalten zu können, konnte Bárczi nicht anders, als eine Delabialisierung in der urungarischen Zeit anzunehmen, um so z. B. die Form *ketnie* des ursprünglich labialen *köt* 'binden' (HB) erklären zu können (1967, 109) — wobei er sogar riskierte, die so entstandenen illabialen Formen zeitlich nach den labialen anzusiedeln (vgl. OklSz. 1138. *Kuteles*). Mit anderen Worten, er nahm eine Entwicklung $a > b > a$ an. Wie viel leichter wäre es aber zu akzeptieren, dass es sich an der besagten Stelle nur um eine Besonderheit der Schreibweise handelt, bei der gerade der Buchstabe *e* das Vorhandensein des offeneren Lautes (*ö*) im Unterschied zu dem geschlosseneren (*ü* — vgl. obiges Beispiel aus OklSz.) anzeigt! Ein bisschen weiter ausholend kann man aus einem handschriftlichen Testament vom Anfang des 16. Jahrhunderts (1517) folgendes Beispiel anführen: „*... mynd menes kezeth, mynd Barom kezewt, mynd yhok kewzewt...*“ (Hegedűs–Papp 1992, 65). Es steht außer Zweifel, dass der Urheber aus dem Komitat Tolna, der sein Testament eigenhändig abgefasst hat, die Postposition mit *ö* gesprochen hat, und dennoch schwankt die Rechtschreibung, d. h. für den Laut *ö* wird stellenweise der Buchstabe *e* verwendet. In einem früheren Artikel (Hegedűs 1989, 98–9) habe ich gezeigt, dass die Schreibung der Ortsnamen des Komitats Vas im 15. Jahrhundert bei denen, die heute mit *ö* gesprochen werden und wohl auch damals so gesprochen wurden, die Zeichen *e, u, o* und *ew* aufweist.

Wenn man also davon ausgeht, dass die Laute *a* und *ö* zu Beginn der altungarischen Zeit existierten, kann man ihre Entstehung nur auf das Ende der urungarischen Zeit datieren. Im Zuge dieses Wandels können *a* und *ö* in betonten Silben entstanden sein, indem in Wörtern finnougrischen Ursprungs mit den Stammlauten *u* und *ü* in der urungarischen Zeit infolge der Betonung eine Verstärkung zustande kam, die mit einer Öffnung einherging (vgl. die oben als Beispiele für Velare angeführten Wörter mit dem Anfangsbuchstaben *h*; als Beispiele für Palatale die ungarischen Wörter finnougrischen Ursprungs *öl* 'Schoß', *köcsög* 'Krug', *köd* 'Nebel', *könny* 'Träne', *könyök* 'Ellbogen', *köz* 'Gasse', *köt* 'binden' und *lök* 'stoßen'). In unbetonten Silben dagegen erfolgte in der urungarischen Zeit eine Schwächung, die mit einer Reduktion am Wortende einherging (Schließung) und von einer Labialisierung begleitet war. Eine typische Entwicklungsrichtung der von Benkő (1988, 149) beschriebenen Unbetontheit ist nämlich die Labialisierung. Also geht die Entwicklung in der betonten Silbe von den geschlossenen Lauten zu den offenen und in den unbetonten umgekehrt. Im nächsten Schritt (in der nächsten Periode) ging die Labialisierung in der unbetonten Silbe, die sich in den suffigierten Formen durchgesetzt hatte, auch auf die Stammvokale über (Labialisierung nach Losonczi — vgl. Bárczi 1967, 155), während die in der betonten Silbe entstandene Öffnung auch in den unbetonten Silben zur Geltung kam. Tatsächlich kann man somit von einer Art Überkreuzwirkung sprechen, da in den betonten und in den unbetonten Silben jeweils entgegengesetzte Entwicklungen vonstatten gingen, deren Ergebnisse dann auf die Silben in der jeweils anderen Position gewirkt haben.

Die Veränderungen der Vokale in der altungarischen Zeit lassen sich als Folgen und Ergebnisse dieser Überkreuzwirkung beschreiben. Nach dem Muster der bereits vorhandenen Laute wurde im ersten Abschnitt der Periode *i* zu *ü*, *ë* zu *ö* und *á* zu a labialisiert. In diese Entwicklung lässt sich auch der Wandel $\underset{\smile}{i} > u$ in der unbetonten Silbe (*asszony* 'Frau', *hamis* 'falsch', *Somogy* ⟨ein Ortsname⟩) eingliedern, der mit großer Wahrscheinlichkeit ebenfalls schon zu Beginn der altungarischen Zeit wirksam war. Die andere Richtung dieser Entwicklung war, wie das auch Kenesei aufzeigt (a. a. O., 285), der Wandel $\underset{\smile}{i} > i$ in der betonten Silbe. Das so entstandene *i* schob das dort vorhandene *i* weiter (so Kenesei) oder, wenn letzteres bereits vorher labialisiert war, trat an seine Stelle. Es gibt nämlich Möglichkeiten für die Labialisierung des *i* im Stamm in der urungarischen Zeit (Bárczi 1967, 108–9) und Beispiele dafür vom Anfang der altungarischen Zeit (Gründungsurkunde des Klosters Tihany [TA.]: *cues* 'steinig', *fuegnes* 'sandig'; bei diesen Beispielen muss man auch mit der labialisierenden Wirkung des *w* rechnen). (Auf die Möglichkeit einer solchen Entwicklung weist auch Kenesei in einer Fußnote hin, in der er sich auf eine mündliche Mitteilung von Erzsébet Abaffy beruft und die Erklärung ohne Quellenangabe Gombocz zuschreibt. In Gombocz' „Lautgeschichte" ist in der Tat die Rede davon: Gombocz nimmt für den Wandel $i > ü$ die urungarische Zeit an [zumindest in denjenigen Dialekten, in denen diese Entwicklung erfolgte] — Gombocz 1940, 74). Ich bin der Ansicht, dass man keine dieser Annahmen vollkommen ausschließen kann. Da der Beginn der Veränderung $i > ü$ bis zum Ende der urungarischen Zeit zurück reicht (Bárczi 1967, 156), kann es Wörter gegeben haben, in denen sie schon abgelaufen war, und die bereits begonnene Entwicklung durch das aus $\underset{\smile}{i}$ entstandene $i$ unterstützt wurde (wobei aber auch eine direkte Entwicklung $\underset{\smile}{i} > ü$ nicht kategorisch auszuschließen ist — vgl. Gósy 1998, 277).

In der zweiten Phase kam es bei den Palatalen auch in den unbetonten Silben zur Öffnung, die dann auf die Velare überging, so dass sich in den unbetonten Silben die Veränderungen $u > o$ und $o > a$ vollzogen. [Dass diese Entwicklung vielleicht zuerst bei den Palatalen einsetzte, kann man nach Bárczi (1978, 148–51) behaupten, auch wenn die bereits erwähnten Probleme bezüglich der Lesart der Angaben mit Velaren (Benkő 1980, 91–2, 110) diese Behauptung etwas unsicher machen.]

Es mag überraschen, dass ich die „Phasen" nicht zeitlich definiere. Das liegt daran, dass ich ein Modell vorstellen wollte und zugleich weiß, dass die Veränderung/Entwicklung bei weitem nicht geradlinig war, sondern ein Prozess mit zahlreichen Faktoren. (Beispielsweise lässt sich die Labialisierung auch auf weitere Gründe zurückführen: Einfluss eines labialen Konsonanten, Einfluss des $l$, assimilierende Wirkung eines labialen Vokals — vgl. Egriné Abaffy 1965, 167–73.) Außerdem gibt es entwicklungsgeschichtliche und entwicklungspsychologische Gründe: die neu entstandenen Formen wurden wohl neben den bereits vorhandenen gebraucht; es kann gesonderte Entwicklungen in den Dialekten gegeben haben; die Analogie kann bremsend gewirkt haben; die Entwicklung kann bei Vokalen in labialer bzw. illabialer Umgebung jeweils unterschiedlich gewesen sein; und schließlich kann die Akzeptanz von Neuerungen — darauf deuten die Untersuchungen zu den Entwicklungen in der modernen Dialektforschung hin — auch durch die Lebensweise (türkischer Einfluss) und die Bildung motiviert gewesen sein.

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# COMMENTS ON THE HISTORY OF NON-FINITE VERB FORMS IN HUNGARIAN

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**Abstract**

In *A Historical Grammar of Hungarian* (Benkő et al. 1991; 1992), the chapters on non-finite verb forms (infinitives and participles) were written by the present author. In that book, conciseness, brevity and canonical style were required; due to lack of space, it was impossible for authors to give a detailed discussion of the points made and to motivate their decisions. In this short paper, a number of statements and formulations given there will be clarified; furthermore, an overall picture will be given about the historical system of non-finite verb forms in Hungarian.

**1.** Non-finite verb forms are not treated as a unitary category either in *The System of Present-day Hungarian* (Tompa 1961) or in the standard university textbook (Bencédy et al. 1968). They are discussed in three different places, under nouns, adjectives, and adverbs, respectively. That classification is not followed by most grammars today, although it still crops up occasionally in school grammars (e.g., Szende 1993).

In the majority of recent grammars and handbooks of Hungarian, non-finite verb forms constitute a separate part-of-speech category (Rácz–Takács 1987; Jászó 1991a; Galgóczy 1992; Balázs 1994). They are usually taught that way at Hungarian universities as well; they appear as an independent category e.g., in *A Manual of Hungarian Descriptive Grammar*, with the following remark: "It is noteworthy that non-finite verb forms are not taken to be a separate part-of-speech category in grammars of European languages; they are discussed as part of the category of verb. This is probably due to the fact that, in Indo-European languages, non-finite verb forms play a more important role in the conjugation system than they do in Hungarian. On the other hand, in Hungarian, infinitives and participles have a more dominant syntactic role than in other languages of Europe" (Faluvégi et al. 1994, 47–8). This statement is appropriate in descriptive terms; historically speaking, however,

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the fact is that non-finite verb forms had a prominent role in the development of the system of Hungarian conjugation: "Non-finite verb forms had a major significance in the history of Finno-Ugric languages since their conjugations rested on those forms ... It is no exaggeration to say that the emergence and development of the total system of the morphology and syntax of Finno-Ugric languages as it is today was in fact based on non-finite verb forms. ... But the role of non-finite verb forms in the lives of Finno-Ugric languages is not merely historical and it did not come to an end with the development of some of them into tense and mood markers. The forms that had remained non-finite verb forms have kept their significance in **non-finite verb phrases** of highly diverse structure that are incorporated into sentences either as ornamental patterns or else as expressions of subsidiary actions that are in close relationship of some sort with the main action expressed by the sentence" (Kispál 1966, 19).

*A Historical Grammar of Hungarian* (Benkő et al. 1991; 1992) also treats non-finite verb forms as a separate part of speech. That this should be done was suggested to us by Éva Bottyánffy, whose manuscript study referred to Simon (1974) as the ultimate source of the idea. In fact, the author who first came to the conclusion that non-finite verb forms are to be seen as a separate part of speech was István Papp (1959, 1962). Also, Sándor Károly—by referring to "the system of non-finite verb forms"—had supported the idea of the establishment of that separate category (Károly 1956).

The term *igenév* 'non-finite verb form' is itself a specific Hungarian phenomenon. Károly (1956, 10) points out that grammars of Hungarian started using it as late as in the nineteenth century. The term *melléknévi igenév* '[adjectival] participle' was coined by Sándor Imre, whereas *főnévi igenév* 'infinitive' and *határozói igenév* 'adverbial participle' were first used by Zsigmond Simonyi. The creation of those new terms was obviously concurrent with the process of reforming Hungarian grammar writing in the late nineteenth century. At that time, leading Hungarian grammarians—especially Zsigmond Simonyi and József Szinnyei—did not only renew the practice of Hungarian grammar writing but also gave it a specifically Hungarian flavour, one that is totally different from that of Indo-European grammars (Jászó 1991b). It is quite certain that the specific term was meant to emphasize the special character of Hungarian *igenév*. The unitary part-of-speech classification of non-finite verb forms was not insisted on in those grammars but only because Hungarian grammarians of the late nineteenth century were primarily interested in syntax and paid less attention to part-of-speech categories.

**2.** The main action or event expressed in the sentence is represented by the finite verb form (*verbum finitum*), whereas the subsidiary action or event is represented by a non-finite verbal construction. Such conjunctionless clauses involving non-finite verbal constructions were already characteristic of Proto-Finno-Ugric. The morphological means of subordination first emerged in the separate lives of the individual languages; the analytical type of sentence construction involving conjunctions can be seen as a secondary development. Nevertheless, "synthetic constructions (involving non-finite verb forms) had been retained in a number of languages (Vogul, Ostyak, Finnish)" (Rédei 1997, 40).

In a simple sentence, participles (or infinitives) are either attributive modifiers of nouns or subject/object/adverbial complements of verbs. Participles in *-ó/-ő* and in *-t* ~ *-tt* appear in noun phrases, whereas infinitives in *-ni* and participles in *-va/-ve*, *-ván/-vén* occur in verb phrases. Some participles in *-t* constitute an intermediate category in that their form would suggest that they belong to noun phrases but their function ties them up with verb phrases; these are the participle in *-atta/-ette*, as well as those exemplified by *lakoztában* '(while) dwelling (somewhere)', *nőttön (nő)* 'grow and (grow)', and *jövet* 'on the way here' (lit. 'coming'). The system of non-finite verb forms can be illustrated as in Table 1 (overleaf).

The classification in Table 1 is supported by the origin of non-finite verb forms. In fact, non-finite verb forms of Finno-Ugric descent fall into two groups: primary participles and gerund-based participles/infinitives. The group I call primary participles includes those involving the derivational suffixes *-ó/-ő* and *-t* ~ *-tt*; their structure is verb stem + participial suffix. The suffix of gerund-based forms, on the other hand, came about by the merger of an original participial suffix and a case suffix; the structure underwent reinterpretation of the type (verb stem + participial suffix) + case ending > verb stem + (participial suffix + case ending) > verb stem + new participial suffix. Thus, the two groups are as given in Table 2.

Primary participles are the oldest, they are found in most of the related languages, and their function must have been complex. The older a participle, the more complex its present function, and the more intricate its functional development. Participles in *-ó/-ő* and in *-t* ~ *-tt* occur in almost all conceivable functions of a participle. The functions of gerund-based participles/infinitives, on the other hand, are narrower, easier to circumscribe. It was because of the probable later emergence of gerund-based participles/infinitives that, in writing my chapters in Benkő et al. (1991; 1992), I chose the order primary participle, infinitive, adverbial participle.

*Table 1*

The system of Hungarian non-finite verb forms

<table>
<tr><th>NP</th><th>VP</th></tr>
<tr><td>participle in -ó/-ő [present participle]:<br>ſirou aniath ‘weepeing mother’ (acc.) (ÓMS.)<br>participle in -t ~ -tt [past participle]:<br>tiluvt gimilſtwl ‘from forbidden fruit’ (HB.)<br>participle of the isten adta gyermek ‘God-given child’ type:<br>Dauid ... zerzette zoltar ‘psalm written by David’ (DöbrK.15)</td><td>infinitive in -ni:<br>Iǫuǫ ... viʒ meƶeiteni ‘coming to ladle water’ (MünchK. 87va)<br>participle in -va/-ve [simultaneous adverbial participle]:<br>fugwa ... ulud ‘holding ... you are killing him’ (ÓMS.)<br>participle in -ván/-vén [antecedent adverbial participle]:<br>ele menuen ... lele ‘having gone to meet him ... found him ’ (KTSz.)</td></tr>
<tr><td colspan="2">participle in -atta/-ette:<br>ʒent fferenʒet lewlteuala egÿhaʒ ſeprette ‘he found St. Franciscus sweeping the church’ (JókK.97)<br>participle of the lakoztában ‘(while) dwelling (somewhere)’ type:<br>ſenanal lakoʒtaban yew hoʒʒa nemÿ ... doctor ‘while dwelling at Siena, he was visited by a doctor’ (JókK.95)<br>participle of the nőttön (nő) ‘grow and (grow)’ type:<br>ẏǫtǫn ẏǫňek ‘they are coming and coming’ (1526, cf. MNy. 6 : 448)<br>participle of the jövet ‘on the way here’ (lit. ‘coming’) type:<br>Im bemenett ... leltǫk egh embǫrth ‘as you go in, you find a man’ (WinklK.135)</td></tr>
</table>

*Table 2*

Suffixes of non-finite verb forms

| Suffixes of primary participles: | Suffixes of gerund-based participles/infinitives: |
|---|---|
| *-ó/-ő* < **-k, *-p*<br>*-t* ~ *-tt* < **-tt* | *-ni* < **-n* + **-i̯*<br>*-va/-ve* < **-m* + **-i̯*<br>*-ván/-vén* < **-va/-ve* + **-n* |

Participles involving *-t* must have emerged during the period of Ancient Hungarian. They come in various subtypes. The type in *-atta/-ette* as in *lakatta* ‘when he dwelt, while dwelling’/*menette* ‘when he went, while going’ was functionally an adverbial participle (of time or state/condition). Formally, this type was a person-marked participle. In Late Old Hungarian, its whole paradigm (except 1pl) was attested, whereas in present-day Hungarian it is totally unknown. The type *lakoztában* '(while) dwelling (somewhere)' is close to an adverbial participle; perhaps it forms a transition between a case-marked noun and an adverbial participle. There are several arguments supporting its interpretation as a participle, including, above all, the fact that there is no noun form **lakozta* 'his (state of) dwelling'. Therefore, the segmentation of *lakoztában* must be *lakoz* + *tában*, i.e., verb stem + unitary suffix, as in *lakoz* + *ván* 'having dwelt'. On the other hand, suffixes of this type are not characterized by merger (of both sound shape and meaning) as in gerund-based participles. In instances of *figura etymologica* of the type *nőttön (nő)* 'grow and (grow)', the participle is very much like and adverb; it is an unmodifiable, fossilized form. In the older literature, especially in that of the late nineteenth century, these forms were referred to as participles involving the suffix *-ton/-ten/-tön*, and quite rightly so. They are a rather mysterious type of participles. They do not occur in the codices, whereas in later popular usage they are quite frequent; instances we can cite from 16th century letters include *foglalton-foglal* 'occupy', *futton-fut* 'run', *írton-ír* 'write', *mondton-mond* 'say', *raboltan-rabol* 'rob', *szöktön-szökik* 'jump' (all: 'continuously, all the time, more and more'). Because of their later frequency (although mainly in popular usage) we can assume their earlier existence (cf. Kelemen 1956). At any rate, in view of the degree of merger of the elements of their ending (participial suffix + locative/modal case suffix), items of this type are more participle-like than those of the *lakoztában* type. Finally, adverbs of the type *jövet* 'on one's way here', *menet* 'on one's way there' are of participial origin, too. Sándor Károly also sees the participial suffix *-t* in them, and explains their emergence by reinterpretation (Károly 1956, 15).

The above NP/VP system is "transgressable", items may move in both directions and become more noun-like or more verb-like as time goes by. In older texts, participles involving *-t* plus personal suffix are frequent: *Hadlaua choltat* 'he heard of his death' (HB.). These are close to nouns since they can be independent lexemes (without the case suffix, that is): *holta* 'his death'. However, they are formally distinct from nouns derived by *-at/-et* (such as *gondolat* 'thought', *felelet* 'answer') in that they lack the low vowel that has become part of the latter suffix. Zsigmond Simonyi called them, very aptly, "infinitives in *-t*", since they are grammatical synonyms for infinitives occurring in accusative with infinitive constructions (Simonyi 1907). Similar arguments were given by Klemm (1928–1942). Rédei (1997) also takes the second word of the construction *Hadlaua choltat* to be a participle. However, it is beyond reasonable doubt that in terms of suffixability and modifiability such forms closely resemble nouns. Participles can migrate not only towards nounhood but also towards verbhood. This claim is less well-established, although it arguably contains an element of truth. Concerning participles in *-ván/-vén*, it has been claimed that they were so independent of the main verb in the long and complicated sentences found in codices that their behaviour practically verged on having become a verb (Velcsov 1957).

The classification of participles in *-t* as summarized above is originally due to Fokos (1959). These forms are originally gerunds since they go back to case marked forms; thus, this is not a case of gerunds being used in the function of adverbial participles. The ability of participles to be further suffixed to form adverbials is a tendency going back to Finno-Ugric and going through the whole history of Hungarian. In later periods—sporadically in Late Old Hungarian, but increasingly more often in later times—primary participles also became capable of further suffixation. Forms made up by participles in *-ó/-ő* or *-t* ~ *-tt* plus adverbial suffixes (like *megadóan* 'resignedly', *rakottan* '(in a) loaded (state)') are frequently used but this process has not led to the creation of novel participial suffixes. On the other hand, the oldest participles have thereby moved from the NP to the VP: *megadóan néz* 'stare resignedly', *(félig) rakottan álldogálnak* 'they stand there (half) loaded'.

**3.** Explanations of the richness of function of non-finite verb forms are of two types. One is to trace the multiple functions back to a single function and explain the others from that single function; the other is to assume that there was complexity of function to begin with and operate essentially with splits. For instance, Sándor Károly claims that participles involving the suffix *-ó/-ő* were originally used in an active sense only and that the passive sense with all its shades of meaning, including participles expressing local, temporal, and instrumental relationships, came about from that original function (Károly 1956, 80–2), although he does not exclude "the other possibility", either. That alternative explanation—in fact, an older view and one that is more firmly established in the literature of Finno-Ugristics—is that those participles originally exhibited a complex function, encompassing all later possibilities. The functional richness of Hungarian participles is, on that account, a preserved ancient feature. Similar views are held by Ravila (1945, 149–50) concerning the Finno-Ugric system of derivational suffixes, saying that this is the only way to explain the various meanings that suffixes of ancient origin have in the individual languages today. For participial suffixes, too—in view of the data from related languages—the explanation involving original complexity seems to be more probably true.

Thus, we will assume that original participles were characterized by functional richness and undividedness and that in the course of the history of Hungarian that wealth of possibilities was exploited to a larger or lesser extent.

Functionally speaking, the most complex item must have been the antecedent of the participle in *-ó/-ő*. It was not only a participle but also a *nomen agentis*, a *nomen actionis*, and a *nomen acti*; i.e., as a noun, it may have referred to the agent, the action, and the result of action as well. It had both adjectival and nominal value. In constructions, it may have expressed subject, object, and adverbial relationships. (In my chapters in Benkő et al. (1991; 1992), I introduced the notions of subject and object relationships, and I drew a distinction between local, temporal and instrumental relationships on the one hand and the passive on the other, cf. Fokos 1963, 73–92). Almost the same amount of functional complexity was exhibited by participles in *-t* ~ *-tt*.

The functional richness of the two most ancient participles is illustrated in Table 3. (In *A Historical Grammar*, I also presented parallels from related languages alongside the Hungarian data.)

The nominal function of participles in *-t* ~ *-tt* is a rare phenomenon; this is understandable since, during the Ancient Hungarian period, nouns suffixed *-t*, *-at/-et* got gradually separated from the group of such participles. That functional separation was accompanied by formal separation: the vowel preceding the participial suffix—if it was retained—turned into a mid vowel, whereas that preceding the nominal suffix remained low and was reinterpreted as part of the suffix. That formal separation had not become firmly established even by Late Old Hungarian, cf. JókK.51: *karhoʒattacnac* 'for the damned'. No similar separation occurred in the *-ó/-ő* group. It would have been possible in the case of relics involving the suffix *-g*—if these are really variants of the participial suffix that had retained their original consonantal shape—, but this proved to be a dead end. In fact, such separation was not needed since the forms in *-ó/-ő* themselves were quite firmly established in their nominal meanings. That is exactly why word class shift is not necessary to hypothesize in their case; I would even venture the remark that there is no need for a separate "suffix of occupation" in items like *szabó* 'tailor', *hegesztő* 'welder', what we have is simply the participial suffix.

*Table 3*

The functions of primary participles

| | PARTICIPLES IN *-ó/-ő* | PARTICIPLES IN *-t* ~ *-tt* |
|---|---|---|
| PARTICIPLE | | |
| subject relationship: | *ſirou aniath* 'weeping mother' (acc.) (ÓMS.) | *a· bozza lot viȝèt* 'the water (acc.) turned into wine' (MünchK.86rb) |
| object relationship: | *En ȝeretew fyaym* 'my beloved sons' (JókK.114) | *tiluvt gimilſtwl* 'from forbidden fruit' (HB.) |
| continuous: | *lata ket allo haioth* 'he saw two motionless ships' (DöbrK.355) | *lewlteuala ... ſeprette* 'he found him sweeping it' (JókK.97) |
| perfective: | *Es mōda vr mennèt ki tèrièztǫ* 'and said the Lord who had extended Heaven' (BécsiK.312) | *tiluvt gimilſtwl* 'from forbidden fruit' (HB.) |
| NOUN | | |
| *nomen agentis*: | *Erizeu* 'one who guards', *Latou* 'one who sees' (TÖ.) | |
| | ? *Keuereg, Keuerig* 'one who stirs' (DömAd.) | |
| *nomen actionis*: | *io es gonoz tudo fa* 'the tree of good and evil knowledge' (CIFU 1 : 75) | *Dauid ... zerzette zoltar* 'psalm written by David' (DöbrK.15) |
| *nomen acti*: | ? *Gurguteg* [toponym] (ÓMOlv.56) | |
| local relationship: | *Farkashalowhely* 'wolf's sleeping place' (CD. 3/1 : 156) | (*Maria-nyugotta bukor* 'bush where Mary rested') (Nyr. 71 : 79) (a late instance) |
| temporal relationship: | *huſſhagÿo nappba* 'on Shrove Tuesday' (JókK.26) | |
| instrumental relationship: | *Kezerekeorra* [toponym] (OklSz.) | |

The construction *isten adta gyermek* 'God-given child' can be given the following interpretation: 'a child who is God's donation', i.e., with the participle in a *nomen actionis* meaning. The participle in the construction is suffixed by *-t* plus personal suffix. Therefore, I do not accept the term 'verb/participle' for such forms, I consistently refrained from using it in my chapters. I would by no means subscribe to the view that it is a separate part-of-speech category (cf.

Faluvégi et al. 1994, 44), since—as we saw above—there are quite a number of ambiguous participles (*holta* 'his death' could be a noun/participle, *jövet* 'on one's way here' an adverb/participle, and—if we accept Velcsov (1957)'s view concerning the occasional independent behaviour of *-ván/-vén*—those forms could also be verb/participles). In terms of suffixation, Hungarian participles behave in a uniform manner: they accept nominal suffixes (sometimes even the nominal plural marker: *rakuak* 'they are loaded', VirgK. 145), and that trend was even strengthened during the later history of the language. "Back-verbalization" does not fit the system and is in contradiction with the character of participles.

Table 3 furthermore suggests that the continuous and perfective functions were not separated in Ancient Hungarian and in Early Old Hungarian as sharply as they were later on. That is why I refrained from calling the two types of primary participles 'progressive' and 'perfect', respectively; rather, I referred to them by their suffixes (*-ó/-ő* and *-t* ~ *-tt*) or else by typical examples (*jövet*, etc.).

To summarize, we can say that non-finite verb forms definitely constitute a separate part-of-speech category (*igenév*) in Hungarian grammar. A larger number of forms can be categorized as participles than standard descriptive grammars tell us; additional types include VP-internal forms suffixed by *-t*. However, their ambiguous behaviour (suggesting transitional status) does not warrant creating new part-of-speech categories (like verb/participle) for them; that phenomenon is part of the functional richness that characterizes participles anyway. Let me note here that I do not recognize the category of 'copulative participles', either. In Benkő et al. (1991, 1992) I write about the derivational-suffix-like function of items like *való* 'being (swhere, of/for sg)', *volta* 'his/her/its being (sg)'. In the early periods of the history of Hungarian, non-finite verb forms had a complex function. Therefore, no single (functional) label is appropriate to refer to them; it is better to speak of participles in *-ó/-ő*, participles in *-t* ~ *-tt*, etc. Whether such functional richness is still characteristic of them today, hence descriptive grammars of the present state of Hungarian should also employ such neutral terminology, is a matter for further research (cf. Kiefer 1992, 875–81).

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# NORMATIVE BESTREBUNGEN IM ALTUNGARISCHEN IM SPIEGEL DER BEIGEORDNETEN KONSTRUKTIONEN

ZSUZSANNA PAPP

*Gewidmet dem Gedenken an Professor Endre Rácz*

## Auszug

Von einer aus dem Geflecht der Mundarten durch deren Angleichung aneinander entstehenden und sich über sie erhebenden Sprachvariante kann in dieser Zeit im Ungarischen noch nicht gesprochen werden. Vorliegende Studie stellt aufgrund neuerarbeiteten Materials der Kodexliteratur (Übersetzungsliteratur) aus dem Bereich der beigeordneten Konstruktionen — im Spiegel des Vergleichs mit den lateinischen Textvorlagen — innerhalb eines synchronen Segments die Anfangsschritte der Herausbildung und Entwicklung einer sprachlichen Norm dar. Sie versucht, im Sprachgebrauch der damaligen Zeit die historischen Bewegungen nachzuvollziehen, wobei auch auf die Gründe für die Veränderungen hingewiesen wird.

Die Herausbildung der Literatursprache ist ein langdauernder Prozess, der in jeder Sprache unter verschiedenen Umständen und zeitlich unterschiedlichen politischen und kulturellen Bedingungen abläuft.

Im Ungarischen hat sich die über den Mundarten stehende Sprachvariante aus dem Geflecht und der Angleichung der Mundarten herausgestaltet; aber im ersten Drittel des 16. Jahrhunderts (der hier behandelten Periode) kann noch keineswegs von dieser normativen Sprachvariante gesprochen werden — um so mehr aber von unterschiedlichen Stufen der Vereinheitlichung, von einer ganzen Reihe von Übergangszuständen, die in zuweilen sehr hochgradiger Bewusstheit der Sprachbenutzer geschaffen werden.

In diesen Prozess fügen sich frühe (aus dem 11–13. Jh.) kleine Textdenkmäler ein, die mit Spuren von entwickelter Textstruktur und stilistischen Fähigkeiten die vorangegangene Entwicklung ahnen lassen: Leichenrede und Bittgebet, Altungarische Marienklage, Königsberger Fragment und Streifen sowie Karlsburger Zeilen.

Diese Sprachdenkmäler werden nicht die einzigen schriftlichen Materiale ihrer Zeit gewesen sein, und auch die Periode zwischen den arpadenzeitlichen Textdenkmälern und dem Beginn des ungarischsprachigen Schrifttums in

Buchform am Ende des 14. und zu Beginn des 15. Jahrhunderts (Jókai-Kodex, Hussitenbibel usw.) bzw. dessen Ausbreitung im ersten Drittel des 16. Jahrhunderts kann keineswegs ohne Texte gewesen sein (es ist mit verschollenen und verlorengegangenen Sprachdenkmälern zu rechnen). Das beweist die reiche Ausdrucksfähigkeit der Sprache der hier behandelten Periode sowohl im Bereich der Satzkonstruktion als auch in dem ausgefeilten und konsolidierten spezifischen Kodexschreiberstil (-ideal).

Loránd Benkő ist der Meinung, „...die in den ungarischsprachigen Kodizes des 15–16. Jahrhunderts fixierte und erhaltene ungarische Kirchensprache baut auf der Sprache aus der Zeit unserer Sprachdenkmäler [d. h. der kleinen Textdenkmäler der Árpádenzeit] auf“ (Benkő 1980, 354, 362–81; des weiteren Horváth 1944, 80–101; 1980, 75–85; Pais 1953, 430–4; Bárczi 1966, 4–5).

Die sprachliche Vereinheitlichung begann sich in der Schriftsprache auszugestalten und zu formen (Benkő 1960, 32–95; Károly 1961, 385–98; Szathmári 1968, 17).

Nachdem die Ungarn das Christentum angenommen hatten, entstand und stabilisierte sich im Rahmen der Kirche jene gelehrte Priesterschicht, die dazu berufen war, die offizielle Kirchensprache, das Lateinische, zu verbreiten, zum Träger und Diener der Ziele der Kirche zu werden und die kirchliche Bildung und Kultur zu popularisieren. Diese Tätigkeit verlangte von dieser gelehrten Priesterschicht eine Textgestaltung auf höherem Niveau in Wort und Schrift. Sie wurde von der Kirche dazu ausgebildet, bei der Verbreitung kirchlicher Werke in den Mönchsorden als Übersetzer oder Kopisten lateinischer kirchlicher Werke an der Herausbildung und Entwicklung der ungarischsprachigen Literatursprache teilzunehmen (Horváth 1944, 79; 1980, 81; Mezey 1955, 33; Benkő 1980, 352; Pais 1953, 430–4). Die Herausbildung und Entwicklung der nationalen Literatursprache setzte also vor allem und am kraftvollsten im Bereich der religiösen Literatur ein; seit der zweiten Hälfte des 15. Jahrhunderts verbreiteten sich das Kirchenlatein und die lateinische Bildung zunehmend mehr, denn die Massen der Laien sollten für die Kirche gewonnen werden; die Zeit dafür war um so mehr gekommen, als im Laufe des 13. Jahrhunderts auch in Ungarn die neuen Predigerorden nacheinander entstanden waren und sich verbreiteten, die Franziskaner und Dominikaner. Damit wurden Übersetzungen lateinischer religiöser Bücher notwendig, die in dichter Folge als in Klöstern handgeschriebene und von diesen vertriebene ungarischsprachige Kodizes erschienen und deren Zahl seit der Wende des 15–16. Jahrhunderts stürmisch zunahm (Horváth 1944, 260–7; 1980, 81–5; Pais 1953, 434; Bárczi 1966, 5).

Mit den zwischen den Klostergemeinschaften wandernden, gegenseitig ausgetauschten Kodizes, also — um János Horváth zu zitieren — mit der Wanderung der literarischen Materialien, entstand ein gewisses literarisches Leben. (Der Gömöry-Kodex [1516] z. B. ist das Werk von 11 Händen, unter ihnen von Kató Legéndy und Pál Tetemy, Vikarius von Nagyvázsony.) Diese Literatenschicht — zu der Nonnen und Mönche als Kopisten (wie Lea Ráskay und Márta Sövényházi) und Übersetzer (Pál Váci und András Nyújtódy) gehörten, die also diese Literatur schufen — verfügte über einen gewissen **gemeinsamen** kirchlichen Sprachschatz; ihre „Literaten"-Tätigkeit war auch insoweit **kollektiv**, als sie ein Verhältnis zwischen Schreiber (Übersetzer, Kopist) und Leser voraussetzte. Die **Gemeinschaft** von Vermittlern und Rezipienten (Lesern, Hörern) kannte die Erwartungen der anderen Seite, und diese Erwartungen regten literatursprachliche Bestrebungen an (Horváth 1944, 106; Pais 1953, 435; Pusztai 1978, 485–90). Der einzelne Übersetzer oder Kopist betrachtete es als wichtige Aufgabe, um der wirksamen **Kommunikation** willen den kaum oder gar nicht des Lateinischen mächtigen Lesern oder Hörern möglichst treu die belehrenden, unterweisenden oder andachterweckenden Texte zu interpretieren: Gebete, Psalmen, biblische Stellen, Heiligenlegenden oder beispielsweise Klosterregeln. Einerseits weist die Klosterliteratur die Spuren der Abhängigkeit vom Lateinischen, des Ringens des Kodexschreibers mit dem Lateinischen auf, andererseits zeigt sich trotz — oder manchmal auch aufgrund — dieser Abhängigkeit in ihr auch die ästhetische Verwirklichung grammatischer Konstruktionsformen.

Ein Bild von der sprachlichen Bewusstheit der Sprachbenutzer bekommen wir nicht nur aus den Angaben, sondern auch aufgrund der Formulierungen und Äußerungen der damaligen Schreiber. So betont der Kartäuser-Anonymus, Verfasser des Érdy-Kodex, die Bedeutung der Übersetzung in die **Muttersprache** — eine sehr wichtige Erkenntnis im ersten Drittel des 16. Jahrhunderts. Noch sprechender aber sind Sylvesters Bemerkungen in seiner *Grammatica*, die auf das damalige **sprachliche Allgemeinbewusstsein** hinweisen. Er betrachtet nämlich gewisse Wörter als inkorrekt, als für den literarischen Sprachgebrauch ungeeignet. Im Zusammenhang mit den Ausdrucksmitteln der beigeordneten Syntagmen, den Konjunktionen, nennt er z. B. die Wortverbindung *s monda* 'und er sagte' und darin die Konjunktion *s* 'und' „verderbt" (corrupta). Die kopulative Konjunktion *s* ist in den Kodizes — gemessen an den vielen Vorkommen von és — tatsächlich selten(er) zu belegen. Ebenso sollte man nach Sylvester die Konjunktion *penig* zugunsten von *kedig* vermeiden. Sylvesters Beobachtungen können wir entnehmen, dass schon im ersten Drittel des 16. Jahrhunderts das Bedürfnis auf Auswahl der sprachlichen Mittel vorlag, woraus wir wiederum Schlüsse auf die damalige Stufe der Einheitlichkeit der Literatursprache ziehen können (Balázs 1954, 126–9; Horváth 1944, 234–55; Pais 1953, 436, 440).

„Das Kennenlernen der ungarischen [Kodexliteratur und] Literatursprache verlangt nicht nur eine detaillierte Beschreibung des Mundartenausgleichs, sondern auch die bis ins Einzelne gehende Kartierung des Ringens mit dem Lateinischen (später dem Deutschen), das Herausheben aus dem Zustand der Mischsprachigkeit" (Pusztai 1978, 388). Zu dieser „Kartographierung" möge hier der Gang durch einen kleineren Bereich beitragen, d h. die Darstellung solcher Erscheinungen der normativen Bestrebungen, die in den Kreis der lateinischen Area einbezogen werden können. Zuerst werden jene behandelt, die **1. nicht** in das Sprachsystem eingebaut wurden, die sich nicht im Sprachgebrauch verbreiteten, und danach **2.** die große Zahl der als Produkte der Übersetzungsliteratur vorkommenden Synonymhäufungen, die **spezifisch erklärenden** Konstruktionen, die Konstruktionsproblematik und die stilistischen Formen ihrer Arten. Diese Konstruktionen konnten entstehen, weil der Übersetzer und Kopist mit dem Lateinischen kämpfte, aber nicht nur mit ihm, sondern auch mit der durch die Übersetzung geschaffenen ungarischen Kirchensprache. Deren Schwerfälligkeit rührte freilich nicht nur von der Übersetzung aus dem Lateinischen her, sondern ergab sich auch daraus, dass der Text der Vorlage auch selbst zur Schrift- und nicht zur gesprochenen Sprache gehörte (Benkő 1980, 353).

**1.** Eine jeweils kleine Stufe oder Station im Process der Vereinheitlichung bilden — wie schon ausgeführt — die **individuellen Bestrebungen**, die das Ringen mit dem lateinischen Text oder das Kopieren eines Textes mit schwerfälliger, verwickelter Satzstruktur hervorrief. Der Einfluss und die Rolle des Individuums auf die und bei den sprachlichen Veränderungen ist nicht zu bestreiten. Aber von den Verwirklichungen seiner sprachlichen Bewusstheit bleiben nur einige erhalten oder werden zu Präliminarien bzw. Ausgangspunkten wieder neuer Sprachvarianten, andere widersetzen sich — aufgrund ihrer Isoliertheit oder aus anderen Gründen — der Veränderung, haben keine Folgen, d. h. sie gelangen nicht ins Sprachsystem. (Die hiesigen Angaben stammen aus dem Minimalkorpus der Vorarbeiten für *A magyar nyelv történeti nyelvtana*, Bd. I. 1992, II/2 1995, bzw. aus individueller Sammlung und Zufallsfunden in durchgesehenen Texten.)

**1.1.** Als Beispiele für die genannte Erscheinung sind die in der Hussitenbibel (Wiener und Münchner Kodex) konsequent und bewusst verwendeten Konjunktionen zu nennen, die erklärende *és mert* 'etenim' und die konsekutiven *és úgy, és így* 'itaque', mit der Einschränkung, dass diese Lehnübersetzungen noch nicht unbedingt auf normative Absicht zurückgehen, sondern nicht zu unterschätzende Sprachneuerungen, sprachliche Einfälle sind. Beispiele: MünchK. 100ra: „Tu hiutoc ėngėmet meſteꝛn^c ꞇ vꝛnac / ꞇ iol mongatoc *ꞇ meꝛt* [*etenim*] vagoc"; MünchK. 38ra: „Ꝫombat ėmbėꝛėkeꝛt lǫt / nem aꝫ ėmbeꝛ ꝫombateꝛt / *ꞇ ug* [*Itaque*] ėmbeꝛn^c fia ꝫombatnac es vꝛa"; BécsiK. 1: „Meꝛt hallotta vala hog vr tėkėntėttė volna ǫnėpėt ꞇ adot volna ǫnėkic ėtkėkėt *ꞇ ig* [*itaque*] ki ėꝛėdė ǫ zaꝛādoklaťťanac hėlėbǫl". Diese Konjunktionen blieben isoliert, ihr begrenzter Gebrauch verhinderte auch, dass sie zu Zusammensetzungen wurden, selbst wenn sie sich — wie aus den Angaben zu sehen ist — funktional als Einheit verhielten. Sie gelangten nicht in den Sprachgebrauch, **sozialisierten sich nicht**, es gab sie nur in den von Tamás Pécsi und Bálint Újlaki übersetzten — die Hussitenbibel enthaltenden — Kodizes (Rácz 1963, 26–8; Juhász 1992, 789; Papp 1995, 746, 750; des weiteren Benkő 1988, 58).

**1.2.** Ebenso arealer Einfluss des Lateinischen ist die Übernahme der Konjunktion *nam* 'denn' mit genauer und bedeutungsmäßiger Entsprechung durch die unter Konjunktionsmangel leidenden Kodexschreiber. Auch der Gebrauch dieser Konjunktion blieb begrenzt. Eine ganze Reihe von Beispielen lassen sich aus Kodizes beibringen, etwa ApMélt. 19: „Mÿth tazÿgalzh engemeth *nam* en te zeretǫd vagÿok"; NádK. 191: „Iͤottetͤok mikeppen tolvayra, tͤorͤockel, es rudackal megfogni engͤometh *Nam* mindͤon napon veletͤoc voltam a templomba tanetvan ... : Tamquam ad latronem existis cum gladiis et lignis comprehendere me? Cotidie eram apud vos in templo docens ...". (Im lateinischen Original findet sich die Entsprechung des ungarischen *nam* nicht!) — Interessanterweise stoßen wir auch in einer mittelalterlichen Missilesammlung auf *nam* in erklärender Konkunktionsfunktion: 1534: „a germek lowat a fwre bochasd ... ha meg nem etetyk wele a fwwet tehat elwez a lo, *nam* ('denn') talalz ot eleg retet" (KLev. 127.). — Später allerdings geht sein Gebrauch zurück, bis es schließlich in der Sprache verschwindet (Velcsov 1987–1988, 211–7; 1997, 173–7; des weiteren Juhász 1992, 801–2; Papp 1995, 751).

**1.3.** Die Sprachbenutzer aller Zeiten verwenden — aus dem Zwang heraus, Neues zum Ausdruck bringen zu müssen — in den meisten Fällen das vorliegende Sprachmaterial höchst einfallsreich, wenn es gilt, logisch kompliziertere inhaltliche Verhältnisse wiederzugeben. Und gerade in der Zeit der Übersetzungsliteratur stand der Kodexschreiber, wenn er Texte spezieller Bestimmung ins Ungarische übersetzte oder die Übersetzungen kopierte, häufig vor der Aufgabe, die langen scholastischen Erörterungen mit komplizierten Satzkonstruktionen durch Erklärungen und Entfaltungen sich selbst oder dem Leser verständlich zu machen, während er doch um die der Mitteilungssituation am besten entsprechenden Ausdrucksformen bestrebt war (Benkő 1988, 53). Damit war er auch zu eigenen (individuellen!) Veränderungen fähig, wenn er aus dem von ihm beherrschten Sprachmaterial schöpfte. Bei den Ausdrucksmitteln des Verhältnisses beigeordneter Konstruktionsglieder tauchen in Konjunktionsfunktion, sich wie Konjunktionen verhaltend, die Wortformen *értsed, értvén, értsen* 'verstehe es!' auf. Diese sind Imperativformen der 2. und 3. Pers. Sing. des Verbs *ért* 'versteht' sowie des suffixes *-vén*, die in der Wortkonstruktion wie zwischen Gliedsätzen in identifizierender, präzisierender (außerdem verzögernder wie auch Nachdruck gebender) Funktion agieren. Außer den Angaben von Simonyi (1881, 259) und NySz. (Szarvas – Simonyi 1890–1893, 685) hat sich ihre Zahl auch beim Suchen in den Kodizes nur um einige weitere erhöht. Es scheint, dass man sie nicht allgemein benutzte, sondern sie eher nur **individueller** Sprachgebrauch der Schreiber des Tihanyer, des Lobkowitz- und des Érdy-Kodex in den erhebenden, erörternden Teilen der Predigten waren.

Die 2. Pers. Sing. Imp. *értsed* (von ihr gibt es mehr Angaben als von *értsen* und *értvén*) brachte prägnant die **nachdrückliche** Aufforderung zum Ausdruck, etwas zu verstehen oder sich einzuprägen. Die Bedeutung in den Angaben: 'denn, nämlich, d. h.', ja sogar so etwas wie 'nota bene!'.

Die Angaben dokumentieren die Vorkommen von erklärenden Konstruktionen, für den sonstigen Gebrauch (Nachdruck, Verzögerung) s. Papp (1996, 237–41).

Zwischen zwei Konstruktionsgliedern drückt *értsed* Darlegung und Präzisierung aus: LobkK. 64: *Oth erčhed az pokolba*; aber einige Zeilen tiefer, 64: Oth. *az az pokolba* — also ist der Gebrauch beider Ausdrucksmittel austauschbar. (Dieser Kodex ist besonders reich an Darlegungs-Erklärungskonstruktionen: 87: *beloͤl vaǵon az. az. a lelocbe*, 70: *akoron tvdnia mint. itelet napian* usw.); LobkK. 70–1: „O akoron kellemetoͤs leſzoͤn mindoͤn bekeſegel zenvedoͤth haborvſag. es: az ragalmazoknac mindoͤn alnokſag. vͤ zaiokat bee dvgia ¶ *Tahat* ['tunc'] *erched iteletnec napian* vigad es oͤrvl mindoͤn aitatos emboͤr“; aber 65: *Akoron Az az iteletnec napian*; TihK. 206: „Erroͤl monǵa … damaſcenus: Az *anǵalok* [anǵalokrol] *erćed* az *oͤrdoͤgoͤkroͤl*: mikepen nem uotak: ſem uannak: ſem leznek az penitencianak el ueuoͤi“.

Der Schreiber des Érdy-Kodex benutzt die Form *értvén* zwischen den Konstruktionsgliedern mit der Bedeutung 'das heißt': 553: „zolgalnak vala *ewneky, erthween* az *wr iſtennek*“.

Sicherlich wird auch eine breitere Materialsammlung in der untersuchten Periode das Bild von *értsed* und den anderen Formen nicht mehr verändern.

Zur Einsicht in die folgende Periode sei aus *Erdélyi Magyar Szótörténeti Tár* (Szabó 1982, 377) eine Angabe genannt, in der *értsed* ein nachgestelltes identifizierendes erklärendes Konstruktionsglied verbindet: um 1683: „az Prédikatornak ... ad minden ember ... egy egy őregh veka buzat melly nem csak az Erdelyi hanem az *Somlyai es Marghithai vekana* is nagyubb, *ertsed egy egy vekanal* ...“.

Das *értsed* wurde nicht und konnte nicht zur Konjunktion werden, da es nur einem **engeren** Kreis der Sprachbenutzer geläufig war und sich die häufig gebrauchten sprachlichen Elemente zu grammatikalisieren pflegen; hier also gab es keinen Grund für sprachliche Änderung.

Der andere und wichtigere Umstand, der die sprachliche Änderung verhinderte, ist die Tatsache, dass die 2. Pers. Sing. prägnant den Imperativ kennzeichnete und damit auch die Lautform den am Wortende im übrigen leicht geschehenden Veränderungen widerstand, so etwa der Angleichung, Abschleifung und Reduktion (s. die Entwicklung von 2. Pers. Sing. Imp. *hagyd* 'lass!' durch Wortartwechsel und Assimilation *gyd* > *dd* zum Modalwort, s. weiter die Entstehung der Modalwörter **találom* > *talám* > *talán* > *tán* 'vielleicht', *látom* > *lám* 'siehe!' sowie das Schicksal von *hiszëm* > *hiszën* 'denn'; vgl. noch den suffixlosen Zustand der auf die 3. Pers. Sing. verweisenden Form *avagy* 'oder'.)

Im folgenden werden Erscheinungen behandelt, die sich verbreiteten und in den Sprachgebrauch eingebaut wurden.

**2.** Die **spezifisch erklärenden Konstruktionen** sammelten sich im Laufe der Materialsammlung und Verzettelung beim **Vergleich mit dem lateinischen Vorlagetext** und ließen sich von den „traditionellen“ darlegend erklärenden Syntagmen trennen. (Wichtig hinsichtlich der lateinischen Textvorlage ist, dass der erreichbare und entsprechendste lateinische Text benutzt und als Quellentext von mit betrachtet wurde, wobei möglicherweise nicht dieser dem Übersetzer vorgelegen hat.)

Diese zwei- oder mehrgliedrigen Konstruktionen sind so entstanden, dass der Übersetzer ein lateinisches (seltener anderssprachiges) Wort aus dem vorliegenden Quellentext nicht mit einem Wort, mit der ungarischen Entsprechung, wiedergab, sondern mit zwei oder mehreren, und zwar Synonymen. Bei den Konstruktionen stößt man auch auf solche, in denen irgendein Konstruktionsglied ein in den Klöstern bekannteres (fallweise aber doch nicht genug oder sicher bekanntes) lateinisches Wort ist, weshalb der Übersetzer oder Kopist zu seiner Beruhigung auch die ungarische Entsprechung hinzufügte. Der Kodexschreiber erklärt und glossiert also gemäß seinem Sprach- und Stilgefühl, seinem Eifer und seinen Kenntnissen, nimmt für seine Arbeit eventuell auch eine andere Übersetzung zu Hilfe, so wie András Nyújtódy, der Übersetzer (von gut zwei Dritteln) des Székelyudvarhelyer Kodexes, den Text des Wiener Kodexes zu Rate zog. Da die meisten ungarischen Kodizes (eventuell sogar mehrfache) Kopien sind, mag auch der Kopist entsprechend seines Sprachgefühls und eventuell Dialektes den Text verändert und mitgestaltet haben. Dieser „wichtigtuerische", „präzisierende" Stil ist charakteristisch für die Kodexschreiber, dies alles ist mit ihrer Neigung zu übertriebener Ausschmückung und ihrem Bestreben nach Feierlichkeit zu erklären. Von Textbeständigkeit kann zu jener Zeit noch nicht gesprochen werden, wobei aber bei den sakralen Texten aus der Bibel die Psalmen und das Neue Testament eine Ausnahme bilden, weil sie streng textgetreu übersetzt wurden. Diese dogmatische Auffassung war dadurch begründet, dass den wichtigsten Teil der Bibel die Evangelien bilden und diese deshalb nicht verändert werden durften (vgl. Nagy 1981, 44). Andere Teile aber, beispielsweise die alttestamentlichen Geschichten, wurden von Kodexschreiber wegen der Übersetzungsschwierigkeiten auch mit eigenen Erklärungen gewürzt. Dies tat auch der schon erwähnte András Nyújtódy, der für seine Schwester, die Nonne Judit, das biblische Buch Judit „aus dem Lateinischen" übersetzte, wie er in seiner Widmung des Werkes schreibt, und tatsächlich den Originaltext um an **Glossierung** erinnernde Klammererklärungen bereichert hat.

Wir sehen also, dass der Übersetzer oder Kopist bei seiner Arbeit auf das Problem der grammatischen Unterschiede beider Sprachen stieß. Diese Arbeit ließ ihn die Eigenheiten seiner Muttersprache erkennen und zwang ihn dazu, ihren Reichtum auszuschöpfen: unter den Ausdrucksmöglichkeiten zu wählen und Stellung zu beziehen. So war er dazu gezwungen, gewisse Regeln oder Normen aufzustellen (vgl. Szathmári 1980, 44).

Die hierzu gezählten Konstruktionen zeigen, dass der Kodexschreiber einen **alternativen** Wortgebrauch pflegt, als suche er die Wörter wörterbuchartig zusammen. János Horváth äußert sich so über die Arbeit der Übersetzer: „sie sind keine Textschreiber, sondern nur Erklärer der Wörter des fremden Textes ... nicht ‚Schriftsteller', sondern lebende Wörterbücher, und sehen es als ihre Berufung an, sogar mehrere Entsprechungen des lateinischen Wortes anzugeben" (Horváth 1944, 275). Im wesentlichen ist diese Feststellung unbestreitbar, zu bemerken ist aber, dass die Auswahl der Synonyme und die Suche nach den schönsten, meistentsprechenden und dichterischsten, und darüber hinaus ihre steigernde, Erhabenheit ausstrahlende Häufung vielfach nicht den mechanischen Wörterbuchblätterer, sondern einen **Textschöpfer** zeigt.

Von einigen der ungarischen Kodizes—etwa Nagyszombater Kodex (1512–1513), Margaretenlegende (1510), Székelyudvarhelyer Kodex (1526–1528), Teleki-Kodex (1525–1531), Birk-Kodex (Rohübersetzung der Regeln von Pál Váci, 1474), Nádor-Kodex (1508), Buch der Gleichnisse (Példák könyve) (1510) usw. — lässt sich eine Reihenfolge der Häufigkeit aufstellen, wie gern ihre Übersetzer, Kopisten und Kompilatoren bei ihrer Arbeit die explizierende Detaillierung verwendeten, aber die Entstehung und Häufigkeit dieser Konstruktionen wurden auch von gattungsmäßigen Gründen beeinflusst: vom Thema und der Bestimmung der Texte.

Die Konstruktionsglieder bestehen aus **verbalen** und **nominalen** Wortarten. Wichtig sind die **Ausdrucksmittel** des synonymen Verhältnisses der Konstruktionsglieder: die Konjunktionen *és* 'und', *vagy*, *avagy* 'oder', *azaz* 'd. h.' oder die **konjunktionslose** Verbindung bzw. die Kombinierung der Ausdrucksmittel. Meiner Meinung nach kommen die kopulative Konjunktion *és* und die disjunktiven Konjunktionen *vagy*, *avagy* nicht wirklich mit ihrem eigenen Wert und Funktion vor, sondern eher in der darlegenden, präzisierenden oder identifizierenden Rolle von 'mit anderen Worten, d. h.', bezeichnen aber auch die Ergänzung, Detaillierung oder Wählbarkeit. Wenn also die Konstruktionsglieder mit *és* verbunden sind, dann nicht im kopulativen Verhältnis, und wenn sie mit vagy verbunden sind, dann nicht im Verhältnis der Wahl.

Hinsichtlich seines Bedeutungsinhalts und des Verhältnisses zu den anderen kann jedes Konstruktionsglied das Wort für einen engeren Begriff oder gerade entgegengesetzt eine ausführlichere Beschreibung, ja eine ganze Reihe von Erklärungen sein; ein Glied kann auch als genauere Benennung eines anderen dienen.

**2.1.** In einer Gruppe der Wortkonstruktionen entsprechen **einem** (eventuell zwei) **lateinischen Wort** des Quellentextes im Ungarischen **zwei** oder **mehrere** Wörter.

(a) Das kann auch so geschehen, dass eines der Konstruktionsglieder die „Roh-" Übersetzung des lateinischen Wortes ist: PéldK. 67–8: „erews embereket ... *le haytok es le hullatok* : vitales spiritus ... *reflecto*", 67: „eſmeryetewk meg az ty *ky meneſtewket es halaltokat* : Discernetis *exitum*"; Es gibt auch ein Beispiel (JókK. 136), wo das eine Konstruktonsglied die wortgetreue Übersetzung des lateinischen Wortes ist: „vr yeſus cristus meg yelenek ... mendennek *alduan auagÿ yol monduan* : Dominus Jesus Christus apparuit ... omnibus *benedicens*"; usw.

(b) Mit Synonymenhäufung wird die Ausdrucksweise differenzierter: MargL. 4: *epehtenek ragkanak : aedificaverunt, „valtoztateek hozattatek* az clastromban : *translata est* in claustrum", 12: „vgyan azon *fedelet auagy ruhat*: dictum *velum*"; TelK. 24: „az vtakat *meg iaria vala*: *keringi vala* : *circuibat* vias omnes", 17: „*maradekoknac: vnokaknac: auagy őͤrőͤkőͤſőͤknec*: gőͤmőͤlčet nem kőͤuetec :

fructum *posteritatis* consecuti non sunt", 26: „kezde ... *zomorogni*: *es* igön nagon *keſerögni könöuet hullatni* : Coepit ... *contristari et lacrimari* nimis.

Folgende Angabe des Teleki-Kodex ist das vielleicht schönste Beispiel dafür, einen farbigen, erhabenen Stil zu verwirklichen, der die Dinge sichtbar machen und auf die Empfindungen wirken wollte: 18: „ſcent anna azzon *viragozuan: terömthuen: es gömölčözuen* fogadna : Anna *fecundata* conceperit" — mittels Aufzählung der Entwicklungsstufen gibt der Kodexschreiber die lateinische Konstruktion durch das dichterisch schöne Bild vom blühenden und dann früchtetragenden Baum wieder.

Die steigernde Wirkung der detaillierenden Häufung setzen die Kodexschreiber vor allem bei den Passionszenen ein: NagyszK. 17: „*megmöuetenec keſeritenec, es kenzanac* : me *afflixerunt*", „azén *ǵengeſegös zep zerelmes* orczamat ... haǵapalaac es pögdöſeek : faciem meam *amabilem* ... conspuebant" 13: „ki ... *ǵeńerüſegös kedues, es zerelmes* : quae ... eſt *amabilis*" usw.

Die detaillierende Beschreibung kann auch so geschehen, dass der Kodexschreiber bei der Übersetzung auch Unterschiede nach Geschlechtern macht: BirkK. 2b: *ʒabad fiak leańok* : *liberae*; PéldK. 72: „kyk aleytyak vala magokat *vraknak es azzonyoknak* lenny : Qui se credebant *dominos*" — auch dieses Beispiel zeigt, dass es damals möglicherweise noch die Bedeutung *asszony* 'Herrin, Fürstin' gab.

Mit Verben inhaltsvollerer Bedeutung wird die Beschreibung anschaulicher: NagyszK. 8: „roſayat *zedheſſec, es veheſſek* : rosam *habeant*".

(c) Der **alternative Wortgebrauch** (Übersetzung) kommt im Birk-Kodex in großer Zahl vor, dessen Rohübersetzung von Pál Váci stammt und Klosterregeln enthält. Da in den dadurch entstandenen Syntagmen die Glieder einander sehr ähnlich sind, fast identische Bedeutung haben, konnte leicht eine ursprünglich trennende Konjunktion, vagy, auf analogen Einfluss des avagy (ähnlicher Funktion) in die Konstruktion gelangen: 3a: „*se iriak vaǵ ieǵeʒʒek : ne notetur*", 4a: „ʒent kenetet *viǵe vaǵ viſelie* : sacram *deferant* unctionem" usw. — Hier ist anzumerken, dass es sich in gewissem Grade um Wortspaltung handelt.

(d) Die Kodexschreiber passten sich in ihrer Arbeit — von Nyújtódy war im Zusammenhang mit der Übersetzung des Székelyudvarhelyer Kodex schon die Rede — insofern der Leser- oder Hörerschaft an, dass sie mit explizierenden Einschüben ein besseres Verständnis förderten: SzékK. 10: „izrahélnek fyay ... *mégh félémenek, (azaz, megh yedenek)*" — auch in diesem Fall ist die parallele Textübersetzung sprechend: BécsiK. 15: „... *megfelemen*ͨ : filii Israël ... *timuerunt*".

Zuweilen machte man den Text durch eine ganze Reihe von Erklärungen mit verschiedenen erklärenden Konjunktionen noch verständlicher: SzékK. 35:

„mynden *néép*, (*azaz* mynd az *kőzőnſeeg*) Mynd egeez az eyel az *eǵhazban* (*azaz*, az *ſynagogaban, awaǵ*, az *ǵv̈lekezetben*) ymadkozanak : omnis *populus*, et per totam noctem *intra ecclesiam* oraverunt".

(e) Eine Wortkonstruktion konnte auch auf die Weise zustande kommen, dass der Übersetzer oder Kopist — ganz sicher — zur „Verstärkung" Synonyme aufführte: NagyszK. 17: „azén ... orczamat ... *haǵapalaac es pőgdőseek* : faciem meam ... *conspuebant*". Eventuell — da *hagyap(ás)* auch 'osculum; Kuss' bedeutete — hat ihn zu diesem Verfahren auch seine gute Muttersprachenkenntnis oder Mundart bewogen.

Ähnliche Umstände werden eine Rolle beim Entstehen der folgenden Wortkonstruktion aus dem Cornides-Kodex (139v) gespielt haben: „zent praxedis azonnak *huga vagy evcche* : *soror* Praxedis". — *öcs* war ursprünglich ein Wort mit breiterer Bedeutung: 'jüngerer Bruder', 'jüngere Schwester', verengte sich später aber auf den Mannesstamm; s. dazu TESz. *öcs*.

Die Erscheinungen dieser Gruppe könnten mit dem Terminus **explizierende Synonymenhäufung** ezeichnet werden.

**2.2.** Das in den Text eingeflochtene **Fremdwort** — das zumeist **lateinisch** ist — kann auch mit seiner ungarischen Entsprechung zusammen (mit oder ohne Konjunktion) eine Wortkonstruktion bilden.

(a) Reich an solchen „zweisprachigen Syntagmen" sind vor allem Texte belehrenden Zweckes (Ordensregeln), unter anderem der Horvát-Kodex, aber noch mehr die Rohübersetzung des Birk-Kodex mit Verbesserungen, Streichungen und Einschüben. BirkK. 1a: „oʒtaſſek *feidelm aʒʒontol ‹aʒaʒprioriſſatol›* ... elet es ruha : distribuator ... *a praeposita* vestra victus et tegumentum" — im Kodex bedeutet das bekanntere lateinische Wort in spitzen Klammern den nachgesetzten Einschub; 2b: „*diſciplinat feġelmet* ørømeſt ... veġen on maga : *disciplinam* libens habeat" — in diesem Falle geschah die Erklärung mit dem ungarischen Wort.

Das an **Glossierung** erinnernde Verfahren kann am Jókai-Kodex 48 gezeigt werden: „en *[con]ſci[enti]am lelkem* ſemegÿben nem ʒegÿengett meg engemet : in nullo *conscientia* me reprehendit" — *lelkem* ist über die verkürzte Form von *conſcientiam* in den Zeilenzwischenraum geschrieben; 111: „ffrater lleo bod [boldog] ferencʒnek ... *co[n]feſſora gÿwuontatoya* Ira : frater Leo ... *confessor* sancti Francisci scripsit", 45: *Pater: Attyam : Pater*.

Die Konstruktionsweise der in der Klosterliteratur „gängigen" lateinischen Wörter mit ihren ungarischen Entsprechungen mit (*és, vagy, avagy, azaz*) oder ohne Konjunktionen kann mit noch weiteren Angaben belegt werden: GuaryK.

30: „*egígú lelkǫt es conscienciat* meg habozeÿtod : *simplices conscientias* turbas“.

Ein lateinischer Eigenname bildet mit seiner ungarischen Entsprechung (ungarischem geographischen Namen) eine Konstruktion: NagyszK. 15–6: „az *olyuetim heǵere, az az olayfanak heǵere : in montem oliveti*“.

Unter den um wirkungsvolle Kommunikation bemühten Kodexschreibern ragt Lea Ráskay, eine Nonne von der Haseninsel, durch ihre entwickelte Schriftkultur und gutes Stilempfinden hervor. Aus den von ihr kopierten Kodizes seien hier Beispiele der Margaretenlegende genannt, die ihre Biographie und einen ordensgeschichtlichen Rahmen enthält: 9: „*az silenciomot* az *vezteksegtartast* hatra nem vety vala : *silentio* ... non proiecto“, 11: „meg oluastagÿa vala az *passiot* cristusnak *kennÿat* : *passionem* Christi“.

Interessant ist die Übersetzung von *velum*, ebenfalls in der Margaretenlegende: 16: „az ev *veloma auagÿ kezkenevye* [*velum suum*] ... annera vizesevl vala meg . hog annak vtanna ez zent zyz . az *velomot auagÿ kezkenevt* [*velum suum*] meg facharÿa vala . es az sÿralmnak vize kÿ ju vala *belevle* az *velombol*“. Anderswo in diesem Kodex—dies wurde bereits zitiert—gibt der Kodexschreiber *velum* mittels zweier ungarischer Wörter wieder: 12: *fedelet auagy ruhat*.

(b) Außer den Erklärungen lateinischer Wörter gibt es—im untersuchten Korpus—auch die Angabe eines **deutschen** Lehnwortes, das der Kodexschreiber ebenfalls mit Erklärungen versehen zu müssen glaubte: VitkK. 64: „Se valakit toaba *meg* ne *strofol*' [nec aliquem de cetero *reprehendas*], *vag meg ne feǵelmeź*, hanem ha ńiluan istennec ellene vetkezic“. „Mit gewisser Unsicherheit kann auch darauf geschlossen werden, dass der kopierte Text selbst von einem Übersetzer fremder Zunge stammte, weil nur für einen solchen die Übersetzung akzeptabel war“ —meint István Pusztai im Vorwort zum Vitkovics-Kodex (Pusztai 1991, 20).

Die hier (in Punkt **2.2.**a und b) gezeigten Verfahren der Übersetzer- und Kopierarbeit - ob also zu einem lateinischen oder anderssprachigen Wort die ungarische Entsprechung hinzutritt oder die Erklärung und Verständlichmachung umgekehrt geschieht—könnten mit dem Terminus **explizierende Glossierung** charakterisiert werden.

**3.** Im Zusammenhang mit den Erscheinungen, die die normativen Bestrebungen zeigen, stößt man auf einen umstrittenen deskriptiven grammatischen Problemkreis, einen Übergangsstreifen zwischen Bei- und Unterordnung, über den unbedingt kurz zu sprechen ist.

In der Fachliteratur wird der betreffende Konstruktionstyp — wenn auch mit vielen Ausnahmen — zu den Appositionen gerechnet und zudem zu deren identifizierendem Typ.

Hier wäre es zu lang, und es ist auch nicht mein Ziel, die seit Jahrzehnten zu verfolgende deskriptive Grammatikdiskussion wiederzugeben, deshalb möchte ich nur einige wichtigere, das Thema betreffende Knotenpunkte hervorheben. Dabei stütze ich mich auf die gründliche, zusammenfassende und analytische Studie von Judit Balogh-Kardos über die beigeordneten Wortkonstruktionen und ihre Grenzfälle (Kardosné 1989, 57–90), wenn ich über die enger zu diesem Themenkreis gehörenden Meinungen über die Apposition und besonders die identifizierende Apposition berichte (ebd. 68–72).

**3.1.** Für ein beigeordnetes Syntagma hält Dénes Szabó die Apposition in seiner deskriptiven Untersuchung (1958, 281–5)), wobei er die bezeichneten (mit Konjunktionen) und unbezeichneten (konjunktionslosen) Konstruktionen unterscheidet.

Gleichfalls zum Kreis der Beiordnungen rechnet László Antal (1964, 61–8) die Apposition und erklärt, dass „die traditionelle ungarische Grammatik ... einen ihrer größten Irrtümer begangen hat, als sie die sogenannte Apposition oder das nachgestellte Attribut — als Attribut qualifizierte“.

Andere, wie József Tompa (1962a, 261–2), betrachten die Apposition als Übergang zwischen Bei- und Unterordnung, ähnlich urteilt auch Jolán Berrár (1957, 124), aber in einer späteren Arbeit (1967, 453) behandelt sie die Apposition bei den Attributen.

In der genannten Arbeit würde Balogh-Kardos die darlegenden erklärenden Konstruktionen (auch die mit Konjunktion konstruierten) mit der identifizierenden Apposition in eine Gruppe einordnen und die mit und ohne Konjunktion erfolgende Identifizierung voneinander unterscheiden; sie führt die Meinung von Vilmos Farkas (1962, 326) an, der den Übergangscharakter des genannten Typs ebenfalls spürt und von **spezifischer Identifizierung** spricht.

1977 setzte die Diskussion zwischen István Jakab und Sándor Károly im Magyar Nyelvőr ein. Jakab brach eine Lanze für die Beiordnung der Apposition, indem er auch auf die auftauchenden systematischen Probleme hinwies (Jakab 1977, 9–19; 1978, 293–9), Károly betrachtet in seinem Antwortartikel die Apposition als Unterordnung (Károly 1978, 46–50). In einer früheren Arbeit (1958) erörtert er außer den attributiven Appositionen und der Apposition im Kapitel „Die spezifische identifizierende Apposition“ noch die das sog. unmittelbare homogene Verhältnis darlegenden Konstruktionen, die spezifisch identifizierenden Konstruktionen. Deren Glieder gehören zu den verbalen (partizipialen), adverbialen, adjektivischen und numeralen Wortarten. Zu den verbalen bemerkt er mit Nachdruck, sie seien ein sehr seltener Typ (1958, 45–6). Bei ihren Untersuchungen am historischen Material zu den Arbeiten an der historischen Grammatik der ungarischen Sprache reiht Antónia S. Hámori (1991, 706–11; 1995, 396, 404) im Zusammenhang mit dem Konjunktionsgebrauch der appositionellen Konstruktionen in altungarischer Zeit den hier behandelten Konstruktionstyp bei den Appositionen ein und spricht der Konjunktion hervorhebende, Nachdruck gebende Funktion zu; dabei betrachtet sie solche Konstruktionen, zwischen deren Gliedern die „für das beigeordnete Verhältnis typische kopulative Konjunktion steht, aber in nicht kopulativer, sondern steigernder, Nachdruck gebender Funktion“ (1981, 151), als Kontamination des identifizierend appositionellen und des beigeordneten, kopulativen Typs.

Meiner Meinung nach ergibt sich aus dem **Übersetzungscharakter** der ungarischen Klosterliteratur, dass diese aus pragmatischen und stilistischen Gründen entstandenen Konstruktionen anders betrachtet werden sollten.

Die Entstehung dieser Konstruktionen, die ich nicht zu den identifizierenden Appositionen rechne, lässt sich auf **übersetzungstechnische, übersetzerpsychologische** Gründe zurückführen, die auf die in dieser Zeit, in der Periode der Übersetzungsliteratur, verbreitete, allgemein und üblich gewordene Übersetzer-Kopisten-Praxis zurückgehen.

**3.2.** Zusammenfassend lässt sich aufgrund der dargestellten Erscheinungen sagen, dass sich in der Addition solcher individueller Bestrebungen die Keime der Herausbildung der Literatursprache verbergen. In dieser Zeit entstand — und stabilisierte sich — ein **spezifischer Übersetzer-Kopisten-Stil**, von dem wir behaupten können, dass er sich zu einem **Stilideal** erhob. Ja man kann sogar die Feststellung wagen, dass diese — aus dem Boden der Übersetzungsliteratur erblühte — Art der Textgestaltung und -verschönerung zu einer Stileigentümlichkeit der Schriftsprache jener Zeit wurde und später bereits auch selbständig, unabhängig von ihren Entstehungsumständen fungierte.

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# BOOK REVIEWS

**Wolfgang U. Dressler – Oskar E. Pfeiffer – Markus Pöchträger – John R. Rennison (eds): Morphological analysis in comparison. Current Issues in Linguistic Theory Vol. 201.** John Benjamins, Amsterdam/Philadelphia, 2000, 253 pp.

The volume contains selected papers from the *Seventh International Morphology Meeting* held in Vienna, Austria, from February 16 through 18, 1996. In spite of the fact that the volume appeared four years later, the papers have not lost their actuality and they provide an adequate overview of current problems in morphological theory. Morphology internal problems are discussed in six papers, five papers are devoted to the morphology–syntax interface, none of the papers tackles morphophonological problems.

Let us first have a look at the first set of papers.

Henry Davis' paper ('Salish evidence on the causative-inchoative alternation') brings data from a lesser-known language (Lillooet Salish) to bear on the problem of cross-linguistic variation in the causative-inchoative alternation. Many European languages derive inchoatives from causative roots via reflexivization (e.g. German *öffnen* 'open' (caus.)–*sich öffnen* (inch.), French *ouvrir* (caus.)–*s'ouvrir* (inch.), Russian *otverat'* (caus.)–*otverat'sja* (inch.)), Salish, however, derives all causatives from inchoative roots (as does, among others, also Slave, Turkish and Chichewa). It has been noted that the direction of derivation is often dependent on the nature of the predicate involved in the alternation. Internally caused events (e.g. *grow, freeze, rot*) tend to go in the causative (inchoative → causative) direction, while externally caused events (e.g. *break, open*) tend to go in the anti-causative (causative → inchoative) direction. This means that in the vast majority of languages the direction of derivation is neither purely causative nor purely anti-causative—it is split along semantic lines. The paper sketches three possible solutions to the problem. The first one allows lexical representations to vary from language to language, and from predicate to predicate within a language. The author rejects the variable representation approach on conceptual grounds: the variation must be accounted for in terms of rules rather then by individual representations. The second solution is to assume a universally causative representation, which, too, is rejected by the author, who carefully examines six arguments in favour of the causative representation and finds them all inconclusive or invalid. Similar things hold true for the third solution, which would posit a universally inchoative representation. The author argues convincingly that in spite of the fact that Salish has a strongly causative morphological system, it has both derived (anti-causative) and non-derived inchoatives. Thus the variation cannot be reduced to a simple cross-linguistic parameter. Moreover, it cannot be reduced to semantic differences between predicates either. But it can be claimed that for languages different derivational paths are available: simple inchoatives are associated with a causative derivation, derived inchoatives are associated with both a causative and an anti-causative derivation.

Marianne Kilani-Schoch's and Wolfgang U. Dressler's paper ('Are fillers as precursors of morphemes relevant for morphological theory? A case study from the acquisition of French') is a case study on the emergence of (semi-)auxiliaries and subject clitics from so-called fillers, i.e. underspecified positional place holders. The data drawn from French show that fillers respresent a prosodic and phonological strategy in the early period of language acquisition. The child retains some rhythmic and phonological structure, e.g. 'unstressed vowel $+\frac{1}{2}$ stressed syllable'. The first unstressed vowel, the filler, is just an indication for something missing. A typical example of this structure is represented by the sequence 'filler + infinitive'. In the first phase this structure carries almost exlusively pragmatic meaning, in the second phase the structure 'filler + finite verb' emerges, which already carries descriptive meaning whereas the 'filler + Inf' retains its pragmatic meaning, in the third phase this structure extends its descriptive meaning, finally in the last phase the filler is dropped or replaced by the adult form. The development of fillers provides new evidence for a constructivist approach to language acquisition. The child ('Sophie') constructs parts of grammar from a previous phonological basis, and in doing so she does not simply imitate the adults but follows a creative acquisition path of her own. The relatively slow development of fillers affects not only their form but leads to more specific and more grammatical meaning distinctions. The authors argue that the acquisitional data reported on can easily be accommodated into the theory of Natural Morphology but they are incompatible with models which integrate inflectional morphology into syntax.

Mária Ladányi's paper ('Productivity as a sign of category change: The case of Hungarian verbal prefixes') deals with the grammaticalization of a certain type of verbal prefix in Hungarian. The main hypothesis put forward is that in the process of grammaticalization the prefix becomes more productive, and the increase in productivity goes hand in hand with the decrease of co-occurrence restrictions. The plausibility of this hypothesis is shown by the detailed analysis of the prefix *agyon* 'to death, to excess'. The two meanings can easily be kept apart. The author shows convincingly how the second meaning has developed from the first one and how—in the later development—the second meaning got further differentiated. It should be noted (Ladányi's discussion is restricted to Hungarian) that a similar development (of the parallel verbal prefix) can also be observed in other languages. Cf. for example, German *totschlagen* 'beat sb to death' → *sich totarbeiten* 'overwork oneself'. However, the Hungarian prefix is more productive and more polysemous. Ladányi claims that an element can be categorized as a verbal prefix only if lexical meaning has shifted to grammatical meaning. Namely, this would mean that only prefixal elements (most often called preverbs) which express an aktionsart or are used to perfectivize the verb can justifiably be termed verbal prefixes. This goes certainly too far because one would still like to consider preverbs with directional meaning (such as *ki* 'out', *be* 'in', *fel* 'up', *le* 'down') to be prefixes. Maybe, Ladányi's hypothesis holds for preverbs with non-directional meaning only.

Adrienne Lehrer's paper ('Are affixes signs? The semantic relationships of English derivational affixes') is an interesting contribution to the controversy concerning the sign-like behaviour of affixes. Some linguists have argued that affixes are not different from ordinary lexemes, they are just bound. Others take the opposite view: affixes are quite different from lexemes both syntactically and semantically. Lehrer takes a look at some English derivational affixes and shows that they enter into the same semantic relations, such as antonymy, synonymy, hyponymy and meronymy, as lexemes do. Consequently, these affixes cannot be different from lexemes, they must be signs. On the other hand, it should be made clear that there are affixes with very little meaning, which do not enter into the semantic relations mentioned above. (For example, none of the verbal prefixes which carry aktionsart-meaning only could be used in Lehrer's argumentation.) We can, however, readily agree with the conclusion that there is a cline between the lexeme-like and the non-lexeme-like affixes rather than a clear-cut division.

In her paper ('Athabaskan redux: Against the position class as a morphological category') Joyce McDonough argues against the position class as a morphological category. She points out that there is no internal integrity to position classes other than their use as a device in describing complex morphologies. Since a classic example of the extensive use of position classes is found in Athabaskan, it suffices to show that a different, more adequate analysis of Athabaskan morphology is possible. The bipartite model developed in earlier work by the author proposes to analyze the basic Athabaskan verb as a compound consisting of two morphosyntactic constituents, a verb constituent and an auxiliary or 'infl' constituent. The two analyses, the position class analysis and the bipartite analysis, represent opposing views of the structure of the verbal complex. The crucial difference between the two is the concatenation they assume: the bipartite analysis does not use a position class prosthesis, all concatenation is affix to base. In the template model morphemes are assigned to position classes and have the morphological status 'prefix' in the grammar. It is then shown that Stump's model can build words from both the template and the bipartite structure equally well. But in the bipartite structure the position class ordering is completely redundant. The formalism cannot distinguish between the two different structures, the position class structure with its prosthetic template and the bipartite structure in which the ordering is redundant. At the same time, the two analyses make conflicting claims about the morphemes in the word, the structure of the complex, and the kind of morphological entities there are in the world. The author concludes that the formalism based on position classes fails to provide insights into any principles that underlie position class typologies.

Vladimir A. Plungian ('Agentive nouns in Dogon: Neither derivation nor inflection?') discusses a morphological marker in Dogon (West Africa) which seems to be neither affix nor clitic and neither an inflectional nor a derivational marker. Agentive nouns in this language are formed by a marker which is fully productive and has two main uses. In one of its uses, termed 'habitual', the marker shows typical derivational properties (numerous lexical restrictions, frequent idiomaticity, it cannot occur after inflectional markers). Other uses, referred to as 'participle-like', are characterized by the opposite properties: the marker is not lexically restricted, it does not undergo idiomatization, and occupies a position after inflectional markers. This situation is far from being exceptional. In order to account for this type of language a less rigid model of derivational morphology is called for, which would allow derivational markers to occur before as well as after inflection.

The second set of papers has to do with the morphology–syntax interface.

Pablo Albizu and Louis Eguren ('An optimality theoretic account for "Ergative Displacement" in Basque') discuss the problem of 'ergative displacement' in Basque, i.e. the phenomenon whereby an ergative DP is cross-referenced by means of an absolutive prefix with the same specification for person, instead of the expected ergative suffix. The authors propose an optimality theoretic account for 'ergative displacement' (ED). They argue that ED is confined to the mapping between Morphology and Phonological Form, to the process of Vocabulary Insertion and that there exists a prefixal 'position of exponence' in Basque verbal morphology whose obligatory lexical realization motivates either the application of ED or the insertion of 'default prefixes'. Furthermore the authors maintain that the constraint-based approach is superior to the rule-based analysis. Finally, they claim that their analysis supports both late lexical insertion and the existence of an autonomous post-syntactic component.

'Prefixation and the head-complement parameter' is the title of Lluïsa Gràcia and Miren Azkarate's paper. The authors distinguish two types of prefixes: in one case prefixes function as modifiers of the root, whereas in the other case, they function as heads at a certain level of representation with the root acting as their complement. It should be noted that this distinction is also known in other languages. However, the interpretation of prefixes as heads raises at least one problem: the head determines not only the semantic interpretation of the complex but also the word class membership of the complex. Now *preistoria* 'prehistory' is a noun and not a preposition. Moreover, most examples mentioned in the lists in (1) and (2) are lexicalized cases, they do not represent productive patterns. We also know that heads in morphology are quite different from heads in syntax, why should then Lieber's licensing conditions be valid both in syntax and in morphology? The plausibility of Lieber's conditions seems to derive from the fact that they can be used to make certain predictions about prefixes. More precisely, it can be predicted that VO languages will have two types of prefixes whereas OV languages will not have prefixes in a head position. In reality, however, there are also languages which show OV characteristics (alongside of VO features) and which do have both types of prefixes.

The paper by Lluïsa Gràcia and Olga Fullana ('Catalan verbal compounds: Internal order and argument interpretation') discusses the internal order and argument interpretation of Catalan verbal compounds. The authors point out that in Catalan—in contrast to other Romance languages—verbal compounds are not unusual. The question is, however, if verbal compounds can be formed productively, which does not seem to be the case. Even if it may be true that compounds in which the head is preceded by an inalienable possession noun can be analyzed in two different ways, the possibility of interpreting the noun as a direct object of the verbal root should not be excluded. In fact, from the two analyses this latter analysis is more straightforward and intuitively more appealing. But whatever the explanation of the idiosyncratic behaviour of compounds containing inalienable possession nouns as their first member is, a semantic explanation is called for: Why are inalienable possession nouns in this respect different?

In his paper ('Agreement morphology in Chukotkan') Andrew Spencer presents an analysis of verbal agreement in the ergative languages Chukchee and Koryak showing that certain aspects of the system pose problems for current versions of Distributed Morphology and, in fact, for any other theory which seeks to defend the morpheme as the prototypical inflectional piece. The first problem is that Chukotkan agreement exhibits a kind of 'split ergativity' under which some affixes in a word form operate on a nominative/accusative basis, while other affixes in the same word form operate on an ergative/absolutive basis. The second problem is that certain person/number forms in transitive paradigms are syncretic, taking over one or other of an antipassive paradigm. The author concludes that the data support a realizational approach to inflection.

Edwin Williams' paper ('Three models of the morphology-syntax interface') investigates alternative positions about the extent to which syntax can have access to morphological information. One possibility is to consider words atomic, which occupy syntactic positions and have syntactic properties. The internal structure of words and how this structure comes about is irrelevant. On the other end, there is not much difference between word structure and sentence structure, the derivation of the properties of words and the derivation of the properties of sentences are intermingled in various ways. The third model referred to in the title is not made very explicit in the paper, which is rather an extensive critical discussion of minimalist theory from the point of view of morphology. It would seem that the author espouses the strict separation of the lexicon and syntax, and does not believe that affixes appear in syntactic structure. The general conclusion is that minimalist theory cannot account for a number of phenomena (the ordering of elements in thematically based compounding, typological differences between languages, the interaction of lexical scope and syntactic scope) hence word syntax should be kept distinct from sentence syntax, a conclusion with which we readily agree.

*Ferenc Kiefer*

**Stephen C. Levinson: Presumptive meanings. The theory of generalized conversational implicature.** The MIT Press, Cambridge MA & London, 2000, 480 pp.

## 1. A general overview of the book

The book under review is a grandiose, inspiring volume on utterance type meaning in the field of pragmatics. It is an "old–new" book which provides an excellent summary of the relevant previous results in pragmatics including the author's own, as well as presenting the recent developments and achievements in contemporary pragmatics, semantics, syntax, theory of language and cognitive science connected to the issues treated by the author in his basically neo-Gricean theory of generalized conversational implicature. Integrating relevant knowledge from different fields, Levinson aims to defend the notion of generalized conversational implicatures as preferred/default interpretations. Relying on his earlier work to a great extent, he fulfils his goal, first, by showing that some general theoretical sense can be made of the notion of a preferred interpretation; second, by defending the assumption on existence of default interpretations against intensive offensives from various reductionist pragmatics theories (e.g. relevance theory); and third, by showing that the proposed theory of preferred interpretations covers a broad range of important interpretive phenomena (e.g. scalar quantifiers and several kinds of anaphors). In spite of the fact that such a theory can only be "a piece in the jigsaw puzzle of the theory of meaning" (p. xiv), it helps linguists to understand how language works, highlighting the interaction between various levels of linguistic structure and utterance-type structure, mainly semantic vs. pragmatic, syntactic vs. pragmatic; and syntactic, semantic vs. pragmatic levels. Presenting detailed analyses of various linguistic phenomena, Levinson convincingly argues that, to some extent, pragmatics can be considered a component in an overall theory of grammar. The author's theory on pragmatic principles, namely Q-, M- and I-heuristics, plays an important role not only in the intra- and extralinguistic synchronic descriptions of communicative language use, but also in the explanations of several diachronic changes in languages (see especially the relevant subsections in chapters 3 and 4), as well as making clear predictions about language structure at different levels of generalization, and even about possible languages. "These predictions arise because the Q-, M- and I-heuristics operate across the board, generating presumptive inferences that insert themselves willy-nilly into the interpretations of utterances. They thus play a decisive role in structuring lexical fields and syntactic constructions, especially by redundancy constraints: what is implicated need not be coded" (p. 369).

### 1.1. The structure of the book

*Presumptive meanings* has the following structure. It begins with four short sections including 'Conventions' (pp. xi–xii), with the typographical notations and the list of symbols and abbreviations; a 'Preface' (pp. xiii–xv), which lets the audience know what motivations led the author to write the book and what general goals he has; a 'Note to Students' (pp. xvii–xix) with important information on how to use the book effectively in accordance with personal needs and interests, and, finally, Acknowledgements (pp. xxi–xxiii), from which the reader can think that—through building the results of discussions and consultations with a wide range of linguists and students in the book—the approaches of the whole pragmatically oriented linguistic community are present in the book either in the author's theory or in views he criticizes.

After the first four technical and preparatory sections, the author begins to evaluate his theory of generalized conversational implicature in the 'Introduction' (pp. 1–10) and continues it in the four main chapters (pp. 11–365). The fifth chapter, entitled 'Epilogue' (pp. 367–77), summarizes the results and points out some directions for further research. And finally, 'Notes' (pp. 379–423), 'References' (pp. 425–49), a 'Name Index' (pp. 451-5) and a 'Subject Index' (pp. 457–80) conclude the book.

**1.2. A brief synopsis of the individual chapters**

The 'Introduction' (pp. 1–10) already contains important starting theses. The author declares in it that the book is about utterance-type meaning and not about particular, contextually dependent utterance-token meaning investigated in several recent pragmatic works. Utterance-type meanings at a more abstract level are understood as preferred/default interpretations, they are inferences relatively invariant over changes in context and background assumptions. This relative invariance gives these inferences their linguistic importance as it is emphasized by the author (p. 5). The meaning of an utterance-type involves not only the content of the utterance-type but also inferences of a metalinguistic kind. Levinson proposes three heuristics to amplify the utterance-type content. By means of the "analysis" of the way an utterance-type is constructed, these three heuristics refer to the properties of the described situation: whether it is expected, stereotypical or not; whether it is unusual, unexpected or not, and whether it has special properties or has not; and whether it belongs to a contrastive world or not.

In addition to the first general characterization of the heuristics guiding general conversational implicatures, Levinson also situates his theory, radically different from that with which Gricean pragmatics began, among the current approaches to meaning by enumerating his main theses. In his theory he (1) makes a clear distinction between semantics and pragmatics; (2) differentiates semantics from "conceptual structure" or "the language of thought"; (3) specifies the aspects of semantic content by the apparatus of a recursive truth definition; (4) holds that there is no algorithm that could lead from a given syntactic string in a language to its unique logical form or semantic structure; (5) states that semantic representations are partially specified, and (6) claims that pragmatic processes play a crucial role in mapping syntactic structures onto semantic representations, as well as semantic representations onto utterance meanings (pp. 7–8). Furthermore, the semantics-pragmatics distinction is made by Levinson not on the basis of the difference between sentence-meaning and utterance-meaning (speaker's meaning), as it is in standard Gricean theory. Levinson argues that instead of thinking of the distinction in terms of levels of representation, one should consider both semantics and pragmatics component processes that offer their own distinctive contributions to a single level of representation. Because of the distinct character these processes have, the distinction between semantics and pragmatics must be retained.

The above statements together result in a new architecture of meaning theory, as it is demonstrated by Levinson in his approach to generalized conversational implicatures, and in the syntax they explain the distribution and typology of anaphoric expressions.

Following the rather explosive theoretical grounding, Levinson introduces the idea of presumptive meanings in the first chapter entitled 'On the Notion of Generalized Conversational Implicature' (pp. 11–72). Presumptive meanings vs. generalized conversational implicatures (abbreviated as GCIs from now on) are defined as default inferences, ones that capture people's intuitions about preferred or normal, expected interpretations (p. 11). They belong to the level of utterance-type meaning interposed between the level of speaker's meaning/utterance-token meaning and the level of expression-meaning/sentence meaning. Levinson develops a lot of arguments to demonstrate the importance of the level of utterance-type meaning in general and GCIs in particular. First, he refers to Grice's program, reminding the reader that it originally presupposed such a level clearly distinguishing the generalized and particularized conversational implicatures which can be illustrated by the following example (p. 16):

(1) A: "What time is it?"
B: "Some of the guests are already leaving."
PCI: 'It must be late.'
GCI: 'Not all of the guests are already leaving.'

Second, Levinson enumerates a number of phenomena such as illocutionary force, presuppositions, and felicity conditions that justify the setting up of the level of utterance-type meaning in a theory of communication. Third, the author presents an argument "from human design" to be effective in communication. To find out the information conveyed but not coded in communication, the communicative partners need some heuristics. They are the following: *Q-heuristic*: "What isn't said, isn't." (p. 31), *I-heuristic*: "What is simply described is stereotypically exemplified." (p. 32), and *M-heuristic*: "What's said in an abnormal way, isn't normal, or Marked message indicates marked situation." (p. 33). The first heuristic can be related to Grice's first Maxim of **Q**uantity: "Make your contribution as informative as required" (p. 35). The second heuristic can be related to Grice's second Maxim of Quantity: "Do not make your contribution **more** informative than is required" (p. 37). This is the Informativeness Principle given by Atlas – Levinson (1981). And the third heuristic can be related to Grice's Maxim of **M**anner: "Be perspicuous" (p. 38). Levinson also discusses how these three heuristics are ordered if inconsistent GCIs arise: Q > M > I. Levinson's fourth argument for a need for the level of utterance-type meaning comes from the formal models of nonmonotonic human reasoning. Levinson convinces the reader that it is possible to formulate a relatively precise theory of default interpretation, "thus there is nothing to inhibit the development of clearly articulated theories of utterance-type meaning" (p. 72). Citing "Gazdar's bucket", Levinson captures what is commonly called the projection problem, giving the order of incremented information as follows (p. 50): first entailments; then Q GCIs, clausal and scalar; then M GCIs, and finally I GCIs. The author's fifth argument is a negative one. Levinson attacks some current reductionist accounts of implicature that do not suppose the level of utterance-type meaning e.g., Sperber – Wilson's (1986; 1995) Relevance theory and explanations based on Lewis's (1979) notion of accommodation. These theories of nonce inferences simply cannot handle the phenomena focal to a theory of GCIs, in Levinson's opinion. And the final, sixth argument is the repetition of Horn's (1972; 1989) observations on how GCIs can account for lexicalization patterns.

In the second chapter entitled 'The Phenomena' (pp. 73–164), Levinson explores the three main genera of GCIs and their consequences in detail. He analyzes a lot of examples, but of course the data examined in the chapter are not exhaustive. The examples, however, are sufficient to demonstrate that preferred interpretations have systematicity both within and across languages. Before starting to investigate how the proposed heuristics operate, Levinson addresses the question "Why three and just three principles?" (p. 74). In the relevant literature one can find various estimates from one (Sperber – Wilson 1986) to ten or more (Leech 1983) principles. As explanatory principles, it is a requirement from the theory of science to suppose only as many principles as absolutely necessary. Levinson's three principles are inevitably necessary to describe the utterance-type meaning, but because of the fact that they are incommensurable, their number cannot be reduced. Levinson presents his data (some of them are famous applications) in terms of Q-, I- and M-heuristics and also tries to clarify these principles. The author devotes a distinct section to each principle, outlines the history of the principles, answers critical comments against them, gives many examples illustrating the power of the principles, and, finally, refers to residual problems. In the section on the Q-principle, he studies scalar implicatures by means of the analyses of entailment scales derived from the operation of quantificational and modal operators, some nonlogical predicates, number words, function words, as well as examining casual implicatures. In the section exploring I-inferences, Levinson gathers a range of well-known phenomena such as conditional perfection, conjunction buttressing, bridging, inference to stereotype, negative strengthening, preferred local coreference, mirror maxim and noun-noun compounds. In the section devoted to the third heuristic, Levinson deals not only with M-implicatures (lexical doublets and rival word formations, lexicalized forms vs. periphrasis, litotes, grammaticalized vs. lexical expressions, zero vs. nonempty morphology, repetition and reduplication) but also with Horn's division of pragmatic labour. The second chapter concludes with a detailed treatment of the interaction of the principles and the projection problem.

The following chapter, 'Generalized Conversational Implicature and the Semantics/Pragmatics Interface' (pp. 165–260), mirrors Levinson's theoretical interest and orientation. The main questions of the chapter are as follows: (1) How does the theory of GCIs influence the architecture of an overall theory of meaning? (2) What aspects of the meaning of a linguistic expression is semantically specified and what aspects are pragmatically enriched? To describe these different aspects of meaning one needs different principles, different components in the overall theory of meaning. (3) How do these components interact? What is the relation between semantics and pragmatics?

Levinson discusses and criticizes the "traditional" views on the semantics–pragmatics distinction. According to the traditional approaches, semantics is an input to pragmatics, i.e. the central idea is that what is said is the input to what is implicated. However, Levinson demonstrates that identifying the referents, fixing the deictic parameters, disambiguating the linguistic string, unpacking ellipses and narrowing generalities (considered preconditions to determining what is said), involves exactly those inferential mechanisms that characterize Gricean pragmatics. Levinson studies the possible solutions of several kinds of "presemantic pragmatics" and "postpragmatic semantics" to these problems and concludes that pragmatic principles could play a role in truth conditions. Let us take only one short example from ellipsis unpacking.

(2) A: "Who came?"
B: "John."

B's answer can be enriched to the proposition *John came* by means of the I-principle and the Gricean maxim of Relevance. The missing predicate can be supplied from the preceding discourse, and after supplying it, the answer acquires a truth-conditional content. One should notice that "pragmatics is involved in the recovery of the elided linguistic material, which must then be semantically interpreted..." (p. 184).

In summary, the main conclusion of the chapter is that GCIs play a role in the assignment of truth-conditional content. As Levinson remarks, "This may seem not only a distinctly odd idea but definitionally impossible, because implicatures are often partially defined in opposition to truth-conditional content" (p. 166). But, if we accept the conclusion coming from the detailed analyses, then we have to drastically revise the traditional understanding of the semantics/pragmatics interface and the information transmission between the components in a general theory of meaning. Levinson emphasizes that we should focus on processes or operations rather than on the representations, and he demonstrates that semantic and pragmatic processes can interleave in the construction of the semantic representations. Where pragmatic processes end up embedded in semantic representations, Levinson establishes intrusion. Even the systematicity of GCIs' intrusion requires the rethinking of the traditional semantics/pragmatics interface.

The fourth chapter, 'Grammar and Implicature: Sentential Anaphora Reexamined' (pp. 261–364), deals with one of the most prominent aspects of grammar, the (mainly syntax)/pragmatics interface. As we have seen, the previous chapter examined how GCIs can influence semantic interpretations, and this chapter investigates how GCIs intrude into grammar. Pragmatic intrusion of this kind is illustrated by the detailed analyses of discourse and sentential anaphors. Levinson starts the chapter by discussing the relation between grammar and pragmatics, then he turns to the problem of coreference. Levinson claims that anaphora is a complex phenomenon, and it is fundamentally pragmatic for at least three reasons (cf. p. 272): (1) the essential patterns of anaphors are cross-, and intrasentential; (2) any semantically general expression can operate as anaphora; and (3) anaphors involve pragmatic resolution between alternatives which themselves may also be constrained by syntax. GCIs restrict and delimit the search for possible antecedents. The use of a semantically general expression (e.g., a pronoun) I-implicates local coreference, the use of a semantically specific expression (e.g., a definite noun), and M-implicates the complementary interpretation, i.e. disjointness in reference from the local NPs. However, it is also worth noting that the Q-principle might also be involved in generating disjoint interpretations (p. 277).

After treating the relation between implicatures and coreferential relations, the author confronts generative binding theory and the alternative pragmatically driven explanations for anaphors. According to generative syntax, there are three binding principles/conditions used in anaphora descriptions: (A) an anaphor is bound in its governing category, (B) nonreflexive pronouns must be free in their governing category, and (C) a lexical NP must be free in all its occurrences. Taking into consideration various configurational and non-configurational languages, Levinson partially reduces binding conditions in two ways. In what is called the A-first account, he eliminates binding conditions B and C, because "their effects seem to be predicted by independently motivated pragmatic principles" (p. 289). Unmarked pronouns pick up the disjoint reference by Q-contrast to reflexives, while pronouns and full lexical NPs generally contrast in reference because of the I-inference to coreference from minimal expression associated with pronouns, with M-contrast to disjointness arising when a pronoun might have been used but a full NP was used instead (p. 326). The A-first pragmatic analysis is not restricted to any specific kind of grammatical theory, it can interdigitate with any current syntactic framework. The second, more radical possibility to reduce binding principles is to eliminate conditions A and C. In this so-called B-first account, only the second binding principle is accepted as a grammatical rule, and the other two conditions are reduced to pragmatic inferences. This account uses the same pragmatic principles as the A-first account, but it is more suitable for certain languages that do not directly code reflexivity, such as Old English, Biblical Hebrew, Austronesian languages, and a number of Australian languages. Levinson also formulates a synthesis of the two accounts, taking a diachronic perspective into consideration. The author's final thoughts in this chapter concern the connection between pragmatics and parameters in language learning and language change, as well as the relation between pragmatics and the generative program.

The fifth and final chapter, the 'Epilogue' (pp. 367–77), does not only provide a summary of the results, emphasizing again the importance of the third level of utterance-type meanings situated between the coded meanings of linguistic expressions and speaker's meanings, but also highlights the predictive power of the theory of generalized conversational implicature, and demonstrates the connection between presumptive inferences and general human reasoning, as well as determining the role of GCIs in linguistic theory.

## 2. Some further comments

*Presumptive meanings* is an intellectually enjoyable tour in the world of meaning and in the world of theories of meaning. The book summarizes, critically evaluates and rethinks what was formulated and achieved in the study of language and meaning in the past few decades. It is a real encyclopedia for pragmaticians in a sense that a great amount of knowledge from the pragmatics literature is involved in it.

The author's main research question in the book, originally coming from Gricean pragmatics, is as follows: What role do generalized conversational implicatures play in communicative language use? Levinson argues that GCIs (i.e. preferred or default interpretations) heavily interact with both syntactic and semantic descriptions, thus pragmatics influences both structure formulation and meaning construction. Evidence in support of these facts yields another crucial consequence: pragmatics can be considered a component in the theory of language. This view on pragmatics radically differs from the approach according to which pragmatics provides a functional perspective on language (cf., for instance, Verschueren 1995), and it is consistent with the modular approach (cf., for instance, Kasher 1991) belonging to the generative paradigm. According to this modular pragmatics, pragmatic competence is a faculty of using knowledge of language to achieve various human purposes. As we have seen, Levinson emphasizes that one should consider both semantic and pragmatic component processes that offer their own contributions to a single level of representation. The pragmatic faculty has a similar status in modular and neuropragmatics, it has an integrative function between various components and processes of the mind (cf. Pléh 2000), and it is not a separate module in the Fodorean sense. Utterance-types can be defined as the "units" of pragmatic competence that disregard particular contextual information and consider only the linguistic properties and the categories of communicative interaction (Németh T. 1995; 1996). Utterance-types are situated at a more abstract level than utterance-tokens. GCIs contribute to the utterance-type meanings, they differ in nature from nonce-inferences because they do not need any particular context.

Kempson (1996) demonstrates that the paradigms of generative linguistics and relevance theory are compatible in spite of the fact that relevance theory deals mainly with nonce-inferences. If we can integrate the theory of presumptive meanings with the generative program in the above-mentioned way and can accept Kempson's argumentation for compatibility between generative and relevance theoretical frameworks, then we might think about whether Levinson's theory of preferred interpretations and relevance theory are really inconsistent or not. The hypothesis of the existence of the level of utterance-type meaning can be in harmony with the cognitive principle of relevance (Sperber – Wilson 1995). If the interpretation processes start their work at the level of utterance-types, it is the most economic way of meaning construction. Supposedly, this stage precedes the mechanisms of context choice that are responsible for achieving communicative relevance. These latter statements may probably be surprising for Levinson, since he considers relevance theory together with other reductionist approaches a rivalling account and he argues against its conception sometimes implicitly, sometimes explicitly and very vehemently through the whole book.

Levinson's book stimulates discussions on several general theoretical topics such as e.g., the semantics/pragmatics interface, the grammar/pragmatics interface, the status of pragmatics in the theory of language, the relation between pragmatics and the theory of mind, as well as the role of formalisms in semantics and pragmatics. *Presumptive meanings* is a provoking volume for any reader. There are a number of arguable special particular problems, solutions, analyses in the various chapters that force the reader to think about them intensively. However, separate studies would be necessary to treat these questions and this also supports the great importance of the book.

Levinson's book is a user-friendly volume written in a brilliant, sometimes ironic, sometimes chaffing style. It avoids the unnecessary use of formalisms, it is redundant in an expectable way, i.e. it contains the necessary repetitions in every chapter. Each chapter has the same structure: first, a brief presentation of problems, second, detailed data analyses, discussion of proposals of rivalling theories and argumentation for the author's solution, and third, a summary of results and conclusions pointing out the remaining unsolved problems. These all guide the readers to find their way through this 480-page book. Levinson gives fairly extensive lists of notes in each chapter, but unfortunately these notes are endnotes and are situated at the end of the book. It is sometimes difficult, sometimes boring to interrupt reading in order to find the notes. It would have been better if the author had integrated the information in notes in the main text, or at least had used footnotes.

In summary, *Presumptive meanings* is well worth reading not only because it is an important contribution in the development of pragmatics, but also because it simply presents the reader with an excellent intellectual experience.

*Enikő Németh T.*

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**István Kenesei (ed.): Crossing boundaries. Amsterdam studies in the theory and history of linguistic science.** John Benjamins, Amsterdam/Philadelphia, 1999, 301 pp.[1]

This volume contains the selected and reviewed conference proceedings of the First Conference on Linguistic Theory in Eastern European Languages (CLITE 1), held at the University of Szeged in 1998. The primary goal of the conference was to bring together the various streams of ongoing syntactic research in Eastern European countries in order to facilitate interaction after the long period in which political factors made it difficult for linguists to convene and be part of the larger international scene. The proceedings serve a similar goal: to make ideas available to a larger public and sustain linguistic research in Eastern Europe by means of testifying the recent upsurge in this field of investigation.

The book can be conceived of as a reader in contemporary Eastern European syntactic theorizing, as it contains discussions about many languages (Slavic, Romanian, Hungarian among others) by various, mostly Eastern European, experts on syntax. The scientific achievements of this book contribute to our understanding of cliticization, verb and verb projection raising, the structure of possessives and nominalizations, event and argument structures of verbs and nominals and many other topics. All articles report about recent research embedded in Government and Binding and Minimalist Theory, analyzing phenomena that are interesting peculiarities of the individual languages, and whose theoretical implications refine our knowledge of universal grammar.

Space restrictions unfortunately prevent me from entering into a detailed critique of every article in the book, so in what follows I confine myself to summing up the basic novelty within each article, with a more articulated account of the articles about Hungarian.

The first two articles in the book contribute to our understanding of the nature of clitics, a recurrent topic in Slavic syntax. In 'Cliticization and clitichood', Olga Tomič reviews the behaviour of some South-Slavic clitics in order to show that clitics do not always wear their

[1] The production of this review was supported by a grant from NWO (Netherlands Organization for Scientific Research).

behaviour on their sleeve: the direction of cliticization is not always lexically marked on them. For example, Macedonian clitics (unlike Bulgarian or Serbo-Croatian ones) become proclitic or enclitic depending on the categorial properties of the verbal head in their clause. If the head of the VP is a [+V, +N] category (as in the case of past and passive participles), the clitic is enclitic, as a result of the participle raising to a clause-initial head and the clitics cliticizing it on the right:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (1) | [$_{\text{Tense/AgrsP}}$ rečeno | [$_{\text{AgrioP}}$ mu | [$_{\text{AuxP}}$ e | [$_{\text{VP}}$ t | [da | bide | točen ]]]]] |
| | told-past-part | him-datCl | is-Cl | | to | be-3sg-subj | punctual |
| | 'He was told to be punctual.' | | | | | | |

If the head of the VP is a [+V, −N] category on the other hand (these are tensed verbs or *l*-participles), the clitics are proclitic due to the fact that in the above representation the verbal head stays in situ in VP, and the clitics cliticize to it from the left. This shows that clitics are rather flexible: they can be Janus-faced with respect to which direction they attach in phonology. This in itself (together with a reclassification of clitic types) is an important addition to clitic-syntax, although not so much when it comes to being explanatory as far as verb movement is concerned: it remains unclear how categorial differences ([+V, +N] vs. [+V, −N]) can underlie the observed phenomena at hand, and therefore, whether this categorial difference is really the relevant factor determining verb movement and the direction of cliticization.

'Eventive TO and the placement of clitics in Serbo-Croatian' by Ljiljana Progovac also deals with clitics. The author settles a huge debate in the literature concerning the phonological/syntactic placement of second position clitics. Second position clitics occur after the first constituent of the clause, the nature of which is debated: it is a phonological constituent according to some researchers, and a syntactic constituent according to others. Consider the following example.

(2) U koju **(li) je** sobu Goran ušao?
in which Q aux room Goran entered
'Which room did Goran enter?'

The phonological approach does not treat *u koju* as a constituent and claims that the placement of the auxiliary clitic *je* (and that of the interrogative *li*) is due to a phonological rule that places the clitic after the first phonological word (*koju*). The syntactic approach treats *u koju* as one syntactic constituent, which fronts to Spec,CP via remnant movements. New evidence for the latter view comes from a non-clitic event-demonstrative *to* element, which shows up clause internally in the same position as clitics in the above:

(3) U koju **(li) je** *to* sobu Goran ušao?
in which Q aux that room Goran entered
'Which room did Goran enter?'

Since *to* is not a clitic, no phonological placement can affect it. Its surface position, within *u koju sobu*, is due to a syntactic mechanism in which *u koju* fronts independently of *sobu* by remnant topicalization. Provided *to* is really a non-clitic element (as other works of the author prove), and remnant topicalization can be worked out, the facts constitute clear evidence for the syntactic approach.

'The structure of Old Russian periphrastic verbal construction' by David Willis discusses participle fronting in perfect and conditional periphrastic verbal constructions in Old Russian, the former of which is exemplified in (4):

(4) Kupil" esm' sol' německuju.
buy-past-part am-1sg salt-acc German-acc
'I have bought German salt.'

This type of verb movement had been claimed to be head movement to $C^0$ in a related language, Bulgarian (Rivero 1991). Old Russian, however, resists such an analysis, as in this language topic, focus and *wh*-items, which are claimed to be in Spec,IP by King (1995), can precede the initial participle. This gives the author reason to believe that the participle obligatorily left-adjoins $I^0$ (in a movement which is common to all predicates), the non-clitic auxiliary remaining in $I^0$. In case there is an overt complementizer present (e.g., *li*), VPP–*li*–auxiliary order results if V further raises to $C^0$, or *li* and VPP invert in phonology. Since the facts are interesting, one would like to see this analysis recast in a more articulated theory of clause structure: the functional categories referred to are only CP and IP, but it is not clear whether these are all the categories Old Russian had, or whether the author intentionally resorts to the pre-Pollockian model of clause structure this way.

Verb movement is also dealt with in another article: 'Stylistic verb movement in yes-no questions in Bulgarian and Breton' by María Luisa Rivero. It claims that there are types of verb movement, so-called "stylistic" ones, whose triggering factor is not minimalist: they do not happen for feature-checking reasons, but in order to satisfy interface requirements of certain elements. For example, in Bulgarian yes/no questions with the question particle *li*, the requirement that *li* has an overt constituent in its checking domain forces the verb to adjoin *li* on the left (in case there is no other element satisfying *li*). This movement creates a structure similar to a checking configuration, by way of head adjunction. A different type of stylistic verb movement results in a head-complement configuration, which is reminiscent of merge (the verb moves to take an XP in its internal domain, to satisfy the requirement of the latter). Presumably due to space restrictions, the article reads as a rather compressed summary of the overall idea and contains few pieces of supportive evidence for the described state of affairs. For the latter, the references section points to other, more lengthy works by the author.

Verb and verb projection raising is further discussed in two articles on Hungarian, in connection to the word order phenomena involving aspectual/modal/temporal verbal complexes. 'Strategies of complex predicate formation and the Hungarian verbal complex' by Katalin É. Kiss and 'Hungarian complex verbs and XP-movement' by Hilda Koopman and Anna Szabolcsi both present a comprehensive theory of verbal complexes (and complex predicate formation), providing fundamentally different analyses of the same facts, which are constituted by the following patterns:

(5) (a) János szét fogja akarni kezdeni szedni a rádiót.
János apart(VM) will want-inf begin-inf take-inf the radio-acc
'János will want to begin to take apart the radio.' VM-climbing: VM-V1-V2-V3-V4

(b) JÁNOS fogja akarni kezdeni szétszedni a rádiót.
'It is János who will want to begin to take apart the radio.'
straight order:V1-V2-V3-VM-V4

(c) JÁNOS fogja szétszedni kezdeni akarni a rádiót. inverted order: V1-VM-V4-V3-V2

As we see in (5), the position of the verbs and the verbal modifier (VM) with respect to each other is to some extent flexible in Hungarian. The verbal modifier can precede its host verb (5b), it can undergo long movement across many verbs (5a) or it can move together with its host and first embedding verb, the latter two in the reverse order (5c).

To analyze these facts, É.Kiss' analysis contains the following ingredients. The aspectual/modal/temporal verbs (V1,V2, V3 in this case) are "light" verbs, marked in the lexicon. They have two requirements: they have to form a complex with a theta-assigning predicate (the most embedded one) in the syntax, and they have to escape from phrasal stress (that of the leftmost major constituent in a phrase) in phonology. The latter requirement explains why these verbs always have to be preceded by either VMs (5a), other verbs, or focal constituents (5b), or they have to be focalized themselves (not illustrated here). VMs are argued to be heads, which can undergo head movement across several apparent clausal boundaries due to the fact that these form a **local** domain, as a result of complex predicate formation (in other words **restructuring**, i.e., each light verb deletes the phrasal boundary of its infinitival complement). The inverted order (5c) results from successive cyclic incorporation of one verbal head into another, in the usual right-to-left order.

Koopman and Szabolcsi approach (5) with a different underlying idea. They work in a framework in which all movements are overt phrasal movements: VM and (VM+)verb movements alike (they take VMs to be XPs). These movements target newly introduced landing sites: WPs, which stand for the verbal complex right above InfP; and LPs, where arguments and adjuncts raise from out of the VP. The former host the moving VM and (VM+)verb complexes, the latter are necessary to allow for the emptying of the VP, as a result of which remnant VP-movement will raise a single verbal element. The key movements in the derivation of the inverted and straight orders are forced by the lexical requirements of the auxiliaries (i.e., light verbs in É. Kiss' term): the VM must raise to Spec,WP of the selecting verb (if there is no VM, the VP itself moves to Spec,WP to activate this with phonetic material) and auxiliaries need a WP in their own Spec,WP. Since these derivations apply obligatorily, they result in an inverted order (5c) in all cases. The original straight order (5b) emerges if the above movements are masked by further movements. Thus, inverted order ensues when the VM moves to Spec,WP, and WP itself raises higher to Spec,WP(aux). Straight order ensues when the most embedded WP (which contains VM+V) moves to Spec,CP first, and from there pied-pipes the whole CP to Spec,WP(aux), after which CP raises further to a CP-licensing position and the WP(aux) (only containing the auxiliary now) raises even higher than this CP.

É. Kiss very clearly points out that the phenomenon has a phonological base, and in this it converges with some of the findings of María Luisa Rivero in the previous article concerning non-feature-triggered verb movements. The predicates that show the pattern in (5) (among others, *fog* 'will', *lehet* 'may', *akar* 'want', *szokott* 'tend', *talál* 'happen', *szabad* 'be permitted', *kezd* 'begin', *kíván* 'wish', *próbál* 'try') do not form a coherent group on the basis of either semantic or categorial-syntactic criteria, apart from the fact that they take infinitival complements. If it is their phonology that groups them together (the stress-avoiding property), it is a yet unknown interface requirement that motivates the movements described above. At this point, however, not much is known about the syntactic repercussions of PF-requirements, and thus deciding between the two opposing analyses (head versus XP-movement) is pretty much impossible. Some basic facts do not easily lend themselves to an analysis at this point (see the discussion about the head/XP nature of verbal modifiers, where the list of arguments could be continued pro and contra); and the two approaches seem to be complete opposites: what falls out from one has to be stipulated in the other. It may turn out that these facts could easily be accommodated in a syntactic framework that we do not have at our disposal yet.

The available syntactic framework (that of Government and Binding) is certainly sufficient, however, to give a complete account of anti-agreement facts in possessive constructions in Hungarian, as Marcel den Dikken shows in 'On the structural representation of possession and agreement: the case of (anti-)agreement in Hungarian possessed nominal phrases'. In Hungarian possessive constructions the possessum is always adorned by a marker that shows agreement with the possessor. Anti-agreement is found in the case of 3pl possessors, where number agreement is lacking. If the possessor is a pronoun, it lacks plural morphology (6a), if the possessor is a full DP, the agreement marker on the possessum is singular (6b):

(6) (a) az **ő/*ők** kalap-***ja/juk**
the (s)he hat-*3sg/3pl
'their hat'

(b) a **nők** kalap-**ja/*juk**
the women hat-3sg/*3pl
'the women's hat'

To give a comprehensive account of these and also normal agreement facts in possessive nominals, the author first shows (after due criticism of Szabolcsi 1994) that possessive constructions are best analyzed in terms of a predication structure in which a dative PP containing the possessor is predicated about the possessum (the subject), in a small clause: $[_{DP}$ D $[_{SC}$ possessum $[_{PP}$ $P_{dat}$ possessor $]]]$. The dative marker can be overt or covert, the latter corresponding to nominative case on the possessor in Hungarian. From this basic structure, the possessor inverts with the possessum via predicate inversion, and occupies the specifier of a functional projection between DP and the SC. The structure of possessives is therefore the following:

(7) $[_{DP}$ D $[_{AgrP}$ Agr $[_{FP}$ $P_{dat}$ possessor$_i$ $[_{SC}$ possessum $[_{PP}$ $t_i]]]]]$

Anti-agreement easily falls out of this structure in a fashion similar to Rouveret's (1991) account of agreement mismatches in the clausal domain in Welsh, where the finite verb agrees with pronominal but not with full DP subjects. In the case of (7), anti-agreement is a result of the possessor DP not raising into AgrP, forcing the appearance of default singular agreement. Pronominals on the other hand show agreement because they reach AgrP: their Num head raises to $Agr^0$ for independent licensing reasons. This process is actually visible in Hungarian: the number morpheme of the pronominal gets spelled out on Agr, and appears as plural agreement in (6a).

Further, this analysis is made compatible with a great deal of speaker variation, attested in a survey by the author. While nominative possessors uniformly give rise to the pattern in (6) for all speakers, dative marked possessors induce some variation in agreement properties:

(8) a nőknek a kalap-ja/%juk
the women-DAT the hat-3sg/3pl
'the women's hat'

Speaker variation is elegantly handled by assuming that the plural agreeing (8) contains a resumptive pronoun strategy, i.e., the dative noun phrase is generated outside the DP, and is represented inside by a *pro*, which triggers anti-agreement as in (6a) above. The resumptive pronoun strategy finds support in the existence of similar constructions with an overt resumptive singular pronominal ő in the place of the nominative possessor.

Anti-agreement facts fall into place naturally in this account, which is furthermore compatible with the author's conception of possessive constructions in general and the properties of Hungarian concatenative number morphology and agreement facts in particular. The presented account makes Hungarian parallel to languages that express possessors with PPs without any further ado, successfully amending Szabolcsi's (1994) analysis of possessive constructions by explaining the nominative-dative alternation of possessors without resorting to the unlikely movement from one case position to another and without assuming $D^0$ to be the dative case assigner.

The role of D is also dealt with in 'On the syntax of the genitive in nominals: the case of Polish' by Ewa Willim, who discusses crosslinguistic patterns in the distribution of genitive arguments of nouns. Her basic claim is that there are two genitive case licensing positions in a nominal: genitive case can be licensed either by the noun (as an *of*-phrase in English), or on the functional D projection, among other features of the noun, as a free rider. This can be evidenced by the fact that languages where two genitive arguments are disallowed (Polish, Czech, Russian, Latin) lack a syntactically active DP-layer. If one of the genitives is licensed on $D^0$, this particular generalization gets an immediate explanation.

'Aspect and nominalizations: the case of Romanian' by Alexandra Cornilescu takes up Grimshaw's (1990) theory about the difference between event and result nominalizations and modifies it on two points with the help of Romanian data of infinitival and supine nominalizations. First, the subject in event nominals is an argument, and not an adjunct modifier, like in Grimshaw's theory. Second, aspect plays a role in determining the argument structure of derived nominals: if the nominal has a [+telic] interpretation, the object argument has to be projected; if the nominal has a [−telic] interpretation, it suffices to project the agent argument and the object can be missing. The final analysis of these facts is embedded in a minimalist feature checking account of telicity, where it is suggested that telicity is verified in the Gen(itive case)P projection by checking.

'Subjunctive complements, null subjects and case checking in Bulgarian' by Iliyana Krapova proves that Bulgarian subjunctive complements accommodate two types of subjects, depending on the tense specification of the clause. The subject appears as a *pro* (in free variation with an overt DP/pronoun) in case the embedded tense is non-anaphoric on the matrix tense, i.e., can have a possible future interpretation (as is the case with complements to volitional and epistemic predicates). The subject appears as *PRO* if the embedded tense is anaphoric, i.e. the denoted event is always simultaneous with the matrix event. The anaphoric/non-anaphoric tense specifications go together with nominative/null case assigning ability, licensing pro/PRO respectively.

In the last article, 'Non-active morphology in Albanian and event (de)composition', Dalina Kallulli tackles issues connected to the existence of two verbal paradigms in Albanian: the active and non-active paradigms. Adding non-active morphology to an active verb derives a new predicate by changing the lexical meaning of the active predicate as a result of modifying the aspectual template associated with it. This operation either shifts the event type of the predicate into a lower event-type by suppressing the initial subevent in its event structure, or suppressing the name that is associated with the initial subevent.

To conclude, this book presents its readers with an interesting collection of recent articles full of innovative ideas and curious facts. The research presented in these pages is organically linked to the research going on in the rest of the world, both in terms of content and quality.

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# HUNGARIAN BOOKS ON LINGUISTICS

Starting with this issue of *Acta Linguistica Hungarica* we are going to devote a special section to short notices on books on linguistics published in Hungary. Each notice will contain a brief summary of the contents as well as information about the organization of the book.

**Gábor Alberti – István Kenesei (eds): Approaches to Hungarian, Volume 7. (Papers from the Pécs Conference).** JATEPress, Szeged, 2000, 227 pp.

The present volume of the *Approaches* series continues the tradition of publishing high-standard, English language papers from all fields of linguistics. The papers in the volume concern **syntax**, **morphology**, **phonology** and **semantics**. Below we briefly describe the articles, starting with the syntax section.

Gábor Alberti and Anna Medve argue for the advantages of the introduction of projecting operator heads through considering the properties of focus constructions and the "scope-inversion puzzle." The article by Katalin É. Kiss questions the thesis defended by Anna Szabolcsi according to which the structure of the Hungarian noun phrase parallels the English sentence; rather, É. Kiss argues that the structural parallelism holds between the Hungarian noun phrase and the English noun phrase. Anikó Lipták's paper explores the kinship between multiple relative clauses and questions. John Payne and Erika Chisarik focus on the traditional distinction between case suffixes and postpositions by means of analysing the demonstrative constructions in Hungarian; as a result, they suggest a new interpretation of the categories mentioned. Christopher Piñón writes about the peculiarities of the syntax and the semantics of the verbal prefix *végig*. Ildikó Tóth brings synchronic and diachronic data into her analysis of *-va/ván* participles, with especial regard to the resultative construction.

In the morphology section, Huba Bartos studies the connection between the order of the Hungarian affixes and the Mirror Principle. Mária Ladányi takes a look at the derivational innovations in the Hungarian poetic language by means of the notions of productivity, analogy and linguistic creativity.

The phonology section starts with Catherine O. Ringen and Szilárd Szentgyörgyi's paper which explains a difference in the Budapest and the Szeged dialects of Hungarian in the framework of Optimality Theory. Nancy A. Ritter revisits Hungarian voicing assimilation using the tools of Head-driven Phonology.

Finally, the semantics section contains Beáta Gyuris's paper on the different semantic interpretations of *amikor* 'when' and *ha* 'if' connectives in Hungarian.

The volume contains the following papers: 1. Catherine O. Ringen – Szilárd Szentgyörgyi: 'Constraint reranking in the Szeged dialect of Hungarian', 2. Nancy A. Ritter: 'Voicing assimilation revisited in Head-Driven Phonology', 3. Huba Bartos: 'Affix order in Hungarian and the Mirror Principle', 4. Mária Ladányi: 'Productivity, creativity and analogy in word formation', 5. Gábor Alberti – Anna Medve: 'Focus constructions and the "scope-inversion puzzle" in Hungarian', 6. Katalin É. Kiss: 'The Hungarian Noun Phrase is like the English Noun Phrase', 7. Anikó Lipták: 'Multiple relatives as relatives of questions , 8. John Payne – Erika Chisarik: 'Demonstrative constructions in Hungarian', 9. Christopher Piñón: 'The syntax and semantics of *végig*', 10. Ildikó Tóth: '*-Va* and *-ván* participles in Hungarian', 11. Beáta Gyuris: 'On the semantic interpretation of *amikor* 'when' and *ha* 'if' clauses in Hungarian'.

**István Kenesei (ed.): A nyelv és a nyelvek [Languages and language]** Corvina, Budapest, 2000, 234 pp.

This is the fourth, revised edition of an introduction to linguistics, practically the only one that is highly accessible to a general public, yet is solidly based on modern lingusitics. It is the joint effort of a group of nine scholars, which includes mostly linguists, but also a philosopher and a psychologist/psycholinguist. Some of the 14 chapters varying between 10 and 17 pages were written by individual authors, others were a result of the collective work of two or three writers. The authors are János Kelemen, István Kenesei, Ádám Nádasdy, Mária Pap, Katalin Radics, Zita Réger, Katalin Rohonczi, and Anna Szabolcsi.

There are four main divisions, each including three to four chapters. The first, 'The linguistic phenomenon', approaches language form the outside, as it were, as the object of inquiry. It compares human language with animal communication, introduces the reader to the study of signs, and then outlines the methods of the analysis of lingustic phenomena, concentrating on the nature of rules.

The second segment, 'The levels of language', follows the traditional division of sounds, words, sentences and meanings but, relying on familiar terminology, repaints the old picture by the brushes of modern phonological, morphological, syntactic analysis, and makes use of 20th century philosophy of language in the field of semantics.

The third part, 'The varieties of language', surveys dialects, whether social or geographical, language history, typology, and the role of writing and writing systems.

The fourth and last section, 'Language and its user', aims at language as a mental organ. The three chapters discuss language acquisition, the relationship between language and thought, and concludes with an overview of the philosphical problems of language and cognition.

Although the book contains examples from some 53 languages, most of the illustration is of course from Hungarian, the language of the prospective readership. In addition to a Subject and Language Index, it has a list of suggested readings, in case anyone is interested in more than the scope of the book.

**István Kenesei (ed.): Igei vonzatszerkezet a magyarban [Verbal complement structure in Hungarian]**. Osiris, Budapest, 2000, 393 pp.

This is a collection of papers that aims at addressing diverse issues in the complement structure of verbs in Hungarian in order to throw some light on fundamental issues at various levels of grammatical analysis. In addition to lexico-syntactic approaches (Gábor Alberti, István Kenesei, András Komlósy, Tibor Laczkó, Ildikó Tóth), investigations from semantic (Márta Maleczki) pragmatic (Enikő T. Németh), and computational linguistic (Károly Fábricz) angles have also proved highly useful.

The first two papers are concerned with problems of derivation, to put it simply. András Komlósy takes up the problems of causative verbs, or rather the relationship between verbs with and without a causative meaning. In his approach a verb having causative meaning is not necessarily derived from one without it; it may often be the case that a transitive verb (with a causative meaning) underlies the derivation of a "middle" verb, as in *csuk* 'close something' vs. *csuk-ódik* 'close (intr.)'. It also turns out that the causative derivational affix often does not even add a causative meaning, making the investigation even more interesting.

Tibor Laczkó works in the framework of Lexical-Functional Grammar and examines the changes in argument structure in constructions whose head nominals are derived from verbs. The particular derived form serves various purposes and Laczkó is interested in the one that expresses a "complex event". His primary objective is then to make sure that the unwanted versions will not interfere. It is only then that the argument structure of complex event nominals can be discussed. The main thrust of the paper is to show how various verb types behave in the course of the change into nominals and how predictable their properties are.

A different type of modification in verbal argument structure is realized in various nonfinite forms. Ildikó Tóth has chosen the one with the *-vA* suffix. One subclass of this nonfinite verb form has a peculiar property: the subject of its clause is not a nonreferential expletive, as in the sentence *It was important to leave*, but they can be shown not to have a subject at all. She applies accurate syntactic tests and analyses to distinguish constructions in which the subject is merely phonetically empty from those in which the subject is truly missing. Consequently, issues of the theory of grammar are given particular attention in the course of the discussion of these "impersonal resultative" nonfinite clauses.

István Kenesei's article on how to determine auxiliaries in Hungarian is related to Tóth's since she, too, makes use of auxiliaries amongst her points on the one hand, and, on the other, he relies on her findings as regards the impersonal *-vA* nonfinite in constructing tests to show that there are "core" auxiliaries in Hungarian, or more precisely, there is a class of verbs whose argument structure fits that of functional categories (as distinct from "notional" or "substantive" verbs). He argues that the argument structure of auxiliaries is defective, since the subject of the clause they are a constituent of receives its thematic role from the full verb in their complement, which is not a proposition or event, thus it makes no claim to a thematic role either.

Enikő T. Németh investigates why a number of transitive verbs can go without their complements and how the missing complements can be retrieved or the information suppressed made up in the Hungarian equivalents of examples like *Jim accepted* or *Jane contributed to the movement.* First she demonstrates that the (lexical or situational) context of the "indefinite or definite null argument" underdetermines the missing information and then goes on to criticize previous accounts based on discourse analysis or pragmatic approaches, or more exactly, on the maxim of relevance. In fact, she also makes use of relevance herself as the guiding principle in reconstructing the missing arguments in Hungarian, but relies on the conceptual-semantic, i.e., lexical, representation of the verb, as well as typical interpretations and a complex inferential process. These three options then divide Hungarian verbs into three subgroups according to in what combination they figure in the interpretation of their implicit arguments.

The series of articles concentrating on missing arguments is concluded by Károly Fábricz's paper on the lexical representation of complement structures. He takes as his starting point an earlier definition of complements by András Komlósy. The existence of nonobligatory or optional complements involve recurrent decisions as to how to record the entries in question in the lexicon. Computational procedures devised to handle these problems as well as sample entries constitute an important part of his article.

The topic Márta Maleczki has chosen is a prime target for a semantic inquiry. She discusses a construction characteristic to Hungarian: determinerless nouns as arguments of verbs as in *Hugo szendvics-et eszik/*utál* 'Hugo sandwich-ACC eats/*hates'. The reader is guided through first the distinctions of definite and indefinite, specific and nonspecific, then the interpretation of the determinerless nouns and the actions expressed in the clauses they are part of, all the way to the rules governing the use of such arguments on the basis of the meanings of predicate types and the nouns in question. The major distinction suggested is found in the delimiting effect orienting the event denoted by the verb toward some endpoint—in line with, but not equivalent with, the telic/atelic division. Along the route it becomes clear in what properties Hungarian construction formed of determinerless nouns differ from those reported in the literature, including the example quoted above.

Gábor Alberti has an obviously theoretical axe to grind: he is a radical lexicalist and abandons not only transformations, but also syntactic structure at large. With all relevant information in the lexicon, lexical entries are enriched to a much greater degree than has been the case before, especially in mainstream generative grammar, whether transformationalist or lexicalist. For example, an article can be characterized by the requirement of being complemented by a (common) noun, and the grammatical unit thus formed in turn be supplemented by a predicate. Although similar lexicalist approaches are not without precedent, he is probably the first to discuss notions particularly interesting in languages like Hungarian, notably focus and discontinuous constituents.

**Ferenc Kiefer: Jelentéselmélet [Semantic theory]**. Corvina, Budapest, 2000, 381 pp.

The book comprises twelve chapters. The first chapter discusses three appproaches to the description of meaning: formal, cognitive and structural semantics. The author argues that all three approaches are needed but for different purposes. The second chapter deals with the distinction between semantics and pragmatics. It is claimed that semantics deals with conventional (predictable) and pragmatics with non-conventional (non-predictable) meaning. The third chapter discusses the problem of semantic decomposition. The vocabulary can be divided into three parts: (a) relational elements, which allow for an exhaustive semantic decomposition; (b) partly relational elements, which allow for a partial decomposition, and (c) elements which do not admit any semantic decomposition. The fourth chapter is devoted to prototype theory and cognitive semantics. It is shown that these theories cannot replace more formal analyses though they can fruitfully be used to explain certain semantic properties not covered by traditional analyses. Chapter 5 discusses the various ways to deal with polysemy. Special attention is paid to regular polysemy. Chapters 6, 7 and 8 are devoted to the semantics of nouns, adjectives and verbs, respectively. In addition to the discussion of some general problems of the category (e.g. specificity, animacy, genericity in the case of nouns, predicative and attributive use in the case of adjectives, and argument structure, thematic roles, implicit arguments in the case of verb types) each chapter contains aspects of the semantics of word formation as well. Also the semantics of the various types of nouns, adjectives and verbs is discussed. Chapter 9 discusses tense systems and the temporal structure of sentences. The chapter also includes a discussion of the referential properties of participles. Chapter 10 deals with aspect, aktionsart and event structure. Aspect is considered a property of the sentence and aktionsart a morphosemantic property. It is claimed that aspect is derivable from event structure and that event structure is compositional. Chapter 11 tackles the problem of modality. After a brief discussion of the logical and the linguistic tradition in the treatment of modality, a survey of the linguistic expressions of modality is given. The last chapter deals with the problem of presuppositions. Pragmatic presuppositions are kept apart from semantic presuppositions. The chapter concludes with a detailed description of the various types of semantic presuppositions.

Contents: Foreword, 1. Ways of describing meaning, 2. Semantics or pragmatics?, 3. Componential analysis, 4. Prototype theory and cognitive semantics, 5. Polysemy and two-level semantics, 6. The noun, 7. The adjective, 8. The verb, 9. The temporal structure of sentences, 10. Aspect, aktionsart and event structure, 11. Modality, 12. Presuppositions.

**Ferenc Kiefer (ed.): Strukturális magyar nyelvtan 3. Morfológia [A structural grammar of Hungarian, Vol. 3. Morphology].** Budapest, Akadémiai Kiadó, 2000, 1097 pp.

The volume aims at a more or less comprehensive description of the morphology of Hungarian. Productivity is considered a key notion in morphology, therefore the description of inflection, derivational morphology and compounding is restricted to productive patterns. Productivity implies that it is possible to specify (phonologically, morphologically, syntactically and semantically) the set of words which constitute the input to a morphological pattern or rule. Similarly, it must also be possible to determine the phonological, syntactic and semantic properties of the output. This means that the relevant chapters contain a great deal of morphosemantics, which is taken to be an integral part of morphology. There is no theory of morphology which could handle all aspects of morphology (inflection, derivation, compounding, complex verb formation, the morphology–phonology and the morphology–syntax interface) equally well. Consequently, sometimes different chapters may make use of different theoretical approaches. Inflection is first treated in itself without any consideration to syntax in a kind of "word-and-paradigm" model, then a separate chapter is devoted to a possible syntactic account of inflection. Derivational morphology is divided into two major parts: derivation which does not affect syntax is treated separately from syntactically relevant derivation. In the description of the latter an LFG-inspired framework is used. The chapter on morphophonology utilizes aspects of autosegmental and government phonology. Some more general morphological problems are discussed in the first two chapters. The Appendix contains a chapter on psycholinguistic aspects as well as one on the computational treatment of the morphology of Hungarian.

The volume contains the following chapters: 1. Morphological theory (Ferenc Kiefer), 2. On the notion of word, part-of-speech, and affix (István Kenesei), 3. Derivational morphology (Ferenc Kiefer and Mária Ladányi), 4. Syntactically neutral derivations (Ferenc Kiefer and Mária Ladányi), 5. Resultativity (András Komlósy), 6. Deverbal nouns (Tibor Laczkó), 7. Participles (Tibor Laczkó), 8. Verbal particles (Ferenc Kiefer and Mária Ladányi), 9. Compounds (Ferenc Kiefer), 10. Inflection (Ferenc Kiefer), 11. Bracketing paradoxes (Tibor Laczkó), 12. The syntax of inflection (Huba Bartos), 13. Morphonological phenomena (Péter Rebrus). Appendix: Psycholinguistic aspects of the morphology of Hungarian (Csaba Pléh), The computational treatment of Hungarian morphology (Gábor Prószéky).

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... mentioned by several authors (Elgar 1978, 77; Williams 1981, 154–6) ...

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Brockhaus, Wiebke 1995. Skeletal and suprasegmental structure within Government Phonology. In: Jacques Durand – Francis Katamba (eds): Frontiers in phonology: Atoms, structures, derivations. 180–221. Longman, Harlow.

Cole, Jennifer 1995. The cycle in phonology. In: Goldsmith (1995): 206–44.

Goldsmith, John A. (ed.) 1995. The handbook of phonological theory. Blackwell, Cambridge MA and Oxford.

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(1) (a) A sólymaid elszálltak
the falcon-gen-pl-2sg away-flew-3pl
‘Your falcons have flown away.’

Examples can be referred to in the text as (1a), (1a–d), etc.

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*Acta Linguistica Hungarica, Vol. 49 (2), pp. 149–178 (2002)*

# BEMERKUNGEN ZUR GRAMMATIKALISIERUNG ALS ERSCHEINUNG DES SPRACHWANDELS

CSILLA ILONA DÉR

## Auszug

Die Untersuchung der Grammatikalisierung ist eine der wichtigsten Aufgaben der sprachhistorischen Forschungen. Der vielleicht größte Nutzen der neueren Untersuchungen zur Grammatikalisierungstheorie besteht im Zustandekommen eines Dialogs zwischen älteren und neueren Konzeptionen sowie zwischen den verschiedenen Sprachtheorien und Richtungen. So wird die Sprachgeschichte als Resultat der Anwendung der verschiedenen Betrachtungsweisen und Methoden mit weiteren bedeutenden Erkenntnissen bereichert. An diese integrierende Bewegung anknüpfend untersuche ich im Folgenden einige generelle Fragestellungen im Zusammenhang mit der Grammatikalisierung. Ich behandle kurz die kritischen Meinungen, die die Existenz der Grammatikalisierung als Erscheinung des Sprachwandels in Frage stellen, die möglichen Untersuchungsmethoden dieses Vorgangs sowie die allgemeinen Gesetzmäßigkeiten der Entstehung der grammatischen Funktionen. Dann stelle ich einen Typ der Entstehung von Adverbialsuffixen im Ungarischen vor, bei dem sich aus suffigierten Nomen zunächst Postpositionen und dann körperliche Suffixe entwickelten. Um diesen Vorgang der Grammatikalisierung zu illustrieren, analysiere ich das Suffix *-val/-vel* 'mit', dessen Ursprung nicht ganz geklärt ist, im Detail. Damit möchte ich aufzeigen, dass die herkömmlichen ungarischen sprachhistorischen Forschungen mit den neuesten Forschungen, die den Vorgang der Grammatikalisierung selbst in den Mittelpunkt stellen, verknüpft werden können. Die vergleichende Untersuchung bestätigt die Entstehung der Suffixe aus selbstständigen Wörtern.

## 1. Einleitung

**1.1.** Innerhalb der Untersuchungen des Sprachwandels sind die Forschungen zur Grammatikalisierung seit mehreren Jahrzehnten eines der frequentiertesten Gebiete sprachwissenschaftlicher Untersuchungen. Die ahistorischen Sprachtheorien, die in den ersten beiden Dritteln des 20. Jahrhunderts dominierten, wurden von den 70er Jahren an nach und nach von den panchronen Theorien abgelöst, die die Methoden der synchronen und der diachronen Linguistik vereinigen und so auch die Existenzberechtigung der Sprachgeschichte wiederhergestellt haben (z. B. Heine et al. 1991a,b; Hopper–Traugott 1993).

Näher betrachtet sind wir Zeugen einer tiefgreifenden und äußerst produktiven Integration. Die kognitive Linguistik, die Diskursanalyse, die Pragmatik, die Soziolinguistik, die Informations- und Kommunikationstheorie, die

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formale Logik, die funktionale Linguistik, die organische Sprachtheorie und der Evolutionismus tragen allesamt zur Interpretation der sprachgeschichtlichen Phänomene bei, und zwar vor allem zur Interpretation der Natur des Sprachwandels. So sind neue Wissenschaftszweige wie die historische Soziolinguistik, die historische Pragmatik und die evolutive Linguistik sowie so genannte integrierte Theorien entstanden (z. B. LaPolla 1997).

Die Untersuchungen, die sich mit der Entstehung grammatischer Kategorien und innerhalb dieser mit der Entstehung der grammatischen Morpheme beschäftigen, sind keineswegs neu, vielmehr steht das Thema wegen seiner weitreichenden Bedeutung schon seit dem 19. Jahrhundert im Mittelpunkt der Untersuchungen der vergleichenden-historischen Sprachwissenschaft (Junggrammatiker) und der Sprachtypologie (vgl. die Grammatikalisierung als zentrales Erklärungsprinzip in: Ladányi 1998, 407).

Die Grammatikalisierungstheorie — wie sie heute genannt wird — ist wegen ihrer zahlreichen Anknüpfungspunkte ein gutes Experimentierfeld für die meisten Sprachtheorien, da sie sich nicht nur zur Ergründung des Sprachwandels eignet, sondern auch Dialoge anregt (z. B. zwischen den Vertretern der formellen-generativen und der kognitiven Richtungen, s. DeLancey 1993; Fintel 1994 und weiter unten). Die ungarische Sprachwissenschaft befasst sich seit vielen Jahrzehnten intensiv mit der Entstehung der grammatischen Kategorien. Der eindeutigste Beweis dafür ist die dreibändige „Historische Grammatik des Ungarischen“ (A magyar nyelv történeti nyelvtana, im Folgenden TNyt.), die diese Forschungen als einziges Werk zusammenfasst. Die TNyt. gibt einen Überblick über die Veränderungen des ungarischen grammatischen Systems von der urungarischen bis zur späten altungarischen Zeit; gegenwärtig laufen die Arbeiten zur mittelungarischen Zeit.

**1.2.** Die ungarischen sprachgeschichtlichen Untersuchungen befassen sich in erster Linie mit den Details der Grammatikalisierung, was eine vorzügliche Basis für weitere Forschungen darstellt, vor allem für eine zusammenfassende Präsentation der im Ungarischen erfolgten beziehungsweise auch heute erfolgenden Grammatikalisierungsveränderungen, die sich auf das ungarische sprachgeschichtliche Korpus stützt. Erwünscht wären also Werke, die sich eingehend mit dem Prozess selbst beschäftigen. Solche und ähnliche Forschungen laufen bereits in vielen Teilbereichen. Unter den neueren Werken finden sich beispielsweise solche, die die Entstehung einzelner Verbalpräfixe und Suffixe sowie der untergeordneten Nebensätze im Zusammenhang mit der Grammatikalisierung behandeln (Ladányi 1998, 1999; Horváth 1999; Haader 2001), Aufmerksamkeit gebührt jedoch auch einigen früheren Monographien (z. B. Simonyi 1881; 1881–1883; Berrár 1957a,b; Sebestyén 1965; D. Mátai 1989).

Im Folgenden stelle ich, an diese die allgemeineren Zusammenhänge untersuchende Richtung anknüpfend, einige theoretische und praktische Probleme aus dem Themenkreis der Grammatikalisierung vor; dementsprechend gliedert sich meine Studie in zwei Teile. Im ersten Teil beschäftige ich mich kurz mit folgenden Fragestellungen: Kann man überhaupt von der Grammatikalisierung als einer Erscheinung des Sprachwandels sprechen? Was ist eigentlich Grammatikalisierung, und welches sind ihre Hauptmerkmale? Im zweiten Teil untersuche ich die Geschichte eines Typus der Adverbialsuffixe des Ungarischen anhand eines konkreten Beispiels, *-val*/*-vel*. Mein Ziel ist es zu zeigen, dass sich die Ergebnisse der früheren ungarischen sprachgeschichtlichen Forschungen und der neuesten Forschungen zur Grammatikalisierung verknüpfen lassen, wodurch unser Wissen über die sprachlichen Veränderungen bedeutend vermehrt wird.

## 2. Ist die Grammatikalisierung eine Erscheinung des Sprachwandels?

### 2.1. Existiert die Grammatikalisierung überhaupt?

#### 2.1.1. Die Grammatikalisierung unter den sprachlichen Veränderungen

Zunächst sind zwei Betrachtungsweisen zu unterscheiden. Nach der ersten (Newmeyer 1998; McMahon 1994) ist Grammatikalisierung ein sprachliches Phänomen, ebenso wie die Prozesse, aus denen sie resultiert. Der anderen zufolge ist sie nicht (nur) eine direkte oder indirekte Folge sprachlicher, sondern extralinguistischer Faktoren (z. B. Spracherwerb, psychologische und soziale Einwirkungen) (Lightfoot 1999, s. aber Deme 1952, 20–1, 30). Diese Unterscheidung hängt meist davon ab, ob man sprachliche Veränderungen als solche auf äußere und/oder innere Ursachen zurückführt.

Die inneren Faktoren entspringen aus dem Sprachbau selbst, oder auch aus den Wechselwirkungen zwischen den sprachlichen Subsystemen, die äußeren aus den Verhältnissen der Gemeinschaft, die die Sprache benutzt. Früher wurden die inneren und äußeren Ursachen durch die während des Sprachgebrauchs zu Geltung kommenden Faktoren von einander abgegrenzt, die später aber — als natürliche Konsequenz aus der Weiterentwicklung der sprachwissenschaftlichen Forschungen — ebenfalls den inneren zugeordnet wurden. (Martinet beispielsweise zählte die dauerhaft wirkenden psychophysiologischen Faktoren zu den inneren, zu den äußeren rechnete er nur die gelegentlich vorkommenden Phänomene wie Wanderung, Sprachwechsel und Übernahme (s. die detailliertere Besprechung dieser Auffassung in Herman 1967, 159–62).

Der Großteil der Werke über den Sprachwandel nimmt als Auslöser der Veränderungen allgemeinere Motive an, so z. B. Expressivität, Vereinfachung, Erleichterung der Artikulation, Regeländerung (vgl. McMahon 1994, 13–21, 355; Bynon 1997, 36–41, 167–8). Die diesen zugeschriebene Rolle ändert sich meist je nach der zugrunde gelegten Sprachtheorie und der analysierten Sprachebene. Tendenziell werden immer mehr Motive, die früher als äußere galten, als innere eingestuft (Bencédy z. B. erwähnt die soziologischen Faktoren unter den „der Natur der Sprache entspringenden Tendenzen"; 2001, 137–8). Ich sehe ein Problem darin, dass diese Einordnungen, oft sogar die Tendenzen selbst ziemlich ad hoc oder allgemein zu sein scheinen (z. B. „Vervollkommnung", „Integration", „Differenzierung" — s. ebd. und Deme 1952, 19–21).

Auch den extralingualen Faktoren, die Sprachveränderungen verursachen, werden immer mehr Phänomene zugerechnet. Offensichtlich erweitert die Differenzierung der Linguistik, also ihre Teilung in Teilwissenschaften, sowie die Verselbstständigung einiger Bereiche verwandter Wissenschaften (Soziologie, Ethologie, kognitive Wissenschaften) beziehungsweise ihre Integration in die Sprachwissenschaft den Kreis der Faktoren, die in die Untersuchungen einbezogen werden müssen. Das eindeutigste Beispiel hierfür ist die Entstehung der kognitiven Linguistik und ihre Integration in die sprachgeschichtlichen Forschungen. Die Ende der 80er Jahre entstandene kognitive Richtung (Langacker 1987) wurde eine der populärsten Forschungsgebiete unserer Zeit (zu ihren Merkmalen und ihrer Opposition zu anderen Sprachtheorien s. Ladányi 1998, 409–13, auf Ungarisch über die kognitive Linguistik s. auch Bańczerowski 2000; Kertész 2000a,b; Kiefer 2000a,b). Ihre Erklärungen zur Entstehung der Grammatik sowie zur Grammatikalisierung und anderen Sprachveränderungen haben die Sprachwissenschaft mit Erkenntnissen bereichert, die die Untersuchungen der nächsten Jahrzehnten bestimmen werden (vorwiegend mit der ausführlichen Untersuchung der kognitiven Prozesse, die bei der Gestaltung der Grammatik eine zentrale Rolle spielen). Einer der Hauptthesen der kognitiven Linguistik zufolge besteht zwischen der Entstehung der grammatischen Kategorien (Kategorisierung) und der Konzeptualisierung ein enger Zusammenhang beziehungsweise ist ein solcher anzunehmen. Die konzeptuelle (begriffliche) Metapher und Metonymie, die als Verbindungsglieder zwischen diesen beiden gelten, sind zentrale Forschungsgebiete der ungarischen kognitiven Sprachwissenschaft (z. B. Kövecses 1998; Boda–Porkoláb 2001).

### 2.1.2. Die Grammatikalisierung als Spekulation

Die markanteste Kritik, die in der Forschung von Zeit zu Zeit geäußert wird, stellt die Daseinsberechtigung der Grammatikalisierung als solcher in Frage (vgl. „Is there such a thing as 'Grammaticalization'?" — Joseph 2000). Den Status der Grammatikalisierung in Frage stellend behaupten manche, diese Erscheinung sei nur als Konsequenz (bestenfalls als einfacher Mechanismus) zu interpretieren, existiere jedoch nicht eigenständig („Epiphänomen" — s. Newmeyer 1998; Lightfoot 1999, 261 — beide zit. von Traugott 2000, 2, 6; Hopper 1991; Joseph 2000). Nach Meinung dieser Autoren ist die Grammatikalisierung nicht als selbstständige sprachliche Veränderung zu betrachten, weil sie aus anderen Veränderungen abgeleitet werden kann und lediglich die Summe derselben ist.

Die entschlossensten Kritiker halten nicht nur die Grammatikalisierung, sondern auch alle anderen Sprachveränderungen, ja sogar die Sprachgeschichte für eine Fata Morgana, für etwas, das es in Wirklichkeit gar nicht gibt. Newmeyer sieht die Entstehung der grammatischen Morpheme als Resultate dreier sprachlicher Veränderungen (Abb. 1):

1. phonetische Reduktion
2. degradierende Analyse (~ Reanalyse)
3. entsprechende semantische Wandlungen

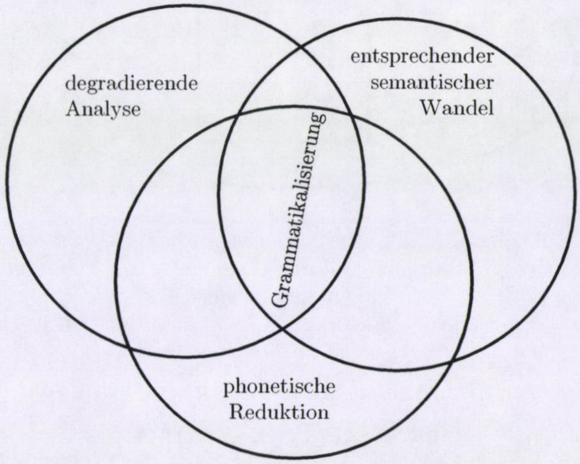


*Abb. 1*
Die Grammatikalisierung als Epiphänomen
(nach Newmeyer 1998, zit. von Traugott 2000, 7)

Seiner Meinung nach existieren die oben erwähnten Prozesse auch unabhängig von der Grammatikalisierung, und ihre selbstständige Funktion spricht gegen die Existenzberechtigung der Grammatikalisierung. Eine der bedeutendsten Vertreterinnen der Gegenseite, die sich für die Existenz der Grammatikalisierung ausspricht, ist die oben bereits erwähnte Traugott. Traugott argumentiert besonders gegen Newmeyers obige Abbildung und die damit verbundenen Behauptungen: Sie listet die sprachlichen Prozesse auf, die die Grammatikalisierung darstellen, und zeigt ihre Merkmale und Zusammenhänge auf. Traugott verlangt in ihren Einwänden Rechenschaft über die Unidirektionalität (die sie für eine zu starke Hypothese hält) sowie die Klärung der Reanalyse. (Die Unidirektionalität, das heißt die Irreversibilität als charakteristisches Merkmal des Prozesses, erkennt übrigens auch Newmeyer an.) Traugotts Konklusion ist schließlich, dass Newmeyer die Grammatikalisierung wegen seiner abweichenden Anschauungsweise anders interpretiert.

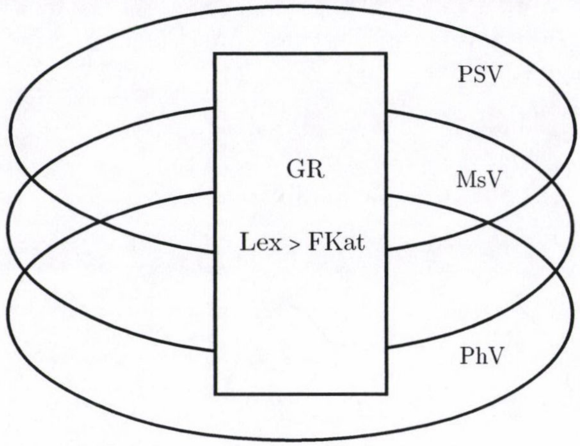


*Abb. 2*
Relationen der Grammatikalisierung zu den pragmatisch–semantischen, den morphosyntaktischen und den phonologischen Veränderungen (nach Traugott 2000, 16)
Lex = lexikalische Kategorie; FKat = funktionelle Kategorie

Die Komponenten der Grammatikalisierung nach Traugott:

1. pragmatisch-semantische Veränderungen (PSV)
2. morphosyntaktische Veränderungen (MsV)
3. phonologische Wandlungen (PhV)

Mit Traugott generell übereinstimmend, sehe ich mehrere Probleme in Verbindung mit dem eliminativen Standpunkt. Zunächst ist zu berücksichtigen, dass

Newmeyers Abbildung nicht mehr aussagt als das weiter oben bereits Gesagte (dass sich die Grammatikalisierung aus 3 Prozessen zusammensetzt), deshalb kann das Fehlen einer Richtungsbezeichnung nicht unbedingt als Mangel dieser Abbildung betrachtet werden. Das Problem seiner Vorstellung liegt gerade darin, dass sie so allgemein ist, dass man diesbezüglich nichts einfordern kann. Vergleicht man sie mit Traugotts Vorschlag (s. Abb. 2), der auch die Richtung der Grammatikalisierung angibt, dann wird deutlich, dass die Richtung der Veränderung in einer Abbildung nur schwer darzustellen ist, weshalb alle derartigen Darstellungen notwendigerweise unvollkommen sind. Die Probleme ergeben sich also aus Newmeyers „fataler“ Vereinfachung, ebenso wie die Folgerung, die Grammatikalisierung sei ein Epiphänomen. (Die Bedeutung dieses Begriffs ist nicht ganz geklärt.) Ich ergänze deshalb Traugotts Kritik mit einigen Punkten:

(1) Die Frage der „Komplexität“: Aus der Zerlegbarkeit folgt nicht, dass die Grammatikalisierung selbst nicht existiert. Wie alle anderen komplexen Prozesse kann auch dieser aufgegliedert werden.

(2) Die Frage des „Wann“ und des „Wie“: Wie Traugott (zusammen mit anderen) festgestellt hat, tritt z. B. die phonetische Reduktion in den späteren Phasen der Grammatikalisierung auf. Einigen Forschern zufolge sind die semantischen Veränderungen Voraussetzungen für alle späteren Prozesse, und diese Teilprozesse hängen eng mit einander zusammen. Die Veränderungen auf den verschiedenen Ebenen erfolgen in der Regel nicht simultan. Die Darstellung ihrer Relationen zu einander, ihrer Verflechtung und ihrer Rolle bei der Grammatikalisierung gehört nicht in eine Abbildung, da der gesamte Prozess in seiner Komplexität darin gar nicht abgebildet werden kann.

(3) Die Frage des „Wo“: Die Geschwindigkeit der sprachlichen Veränderungen kann auch bei den einzelnen Teilsystemen verschieden sein. Es muss betont werden, dass die Grammatikalisierung ein sehr langsamer Vorgang ist, der schrittweise erfolgt. Außerdem ist er unberechenbar, denn er beginnt bei den einzelnen Einheiten jeweils an anderer Stelle und kann auch vor dem Abschluss enden (s. Haader 2001, 365). Das hängt auch mit dem in Punkt 2 Gesagten zusammen: Es lässt sich schwer feststellen, wo eine der Grammatikalisierung zuzuordnende sprachliche Veränderung beginnt, wo sie endet, wann sie parallel zu einer anderen abläuft usw. Dies sind ebenfalls wesentliche Eigenschaften der Grammatikalisierung.

(4) Die Frage der „Ebenen“: Die Aufteilung hängt davon ab, für wie viele Sprachebenen man die Grammatikalisierung als gültig ansieht. Traugott z. B. spricht auch von pragmatischen und syntaktischen Modifikationen

(2000, 16), während Newmeyer letztere — so scheint es — in die Reanalyse integriert hat. Dieser Begriff ist, ebenso wie der der „entsprechenden semantischen Wandlungen“ bei einigen Autoren, ziemlich unklar (es ist nicht egal, wie viele und welche Veränderungen sie beinhalten). Und auch bei Newmeyer ist unklar, wie die Reanalyse mit der Grammatikalisierung zusammenhängt. Außerdem ist es nicht unwichtig, welchen individuellen Grammatikalisierungsprozess man gerade untersucht, denn dieser kann jeweils verschiedene Sprachebenen betreffen.

Zusammenfassend kann man Folgendes sagen: Die funktionalistische Anschauung, die die Existenz der Grammatikalisierung bestreitet, kann theoretisch unendlich fortgeführt werden, denn z. B. auch die semantischen Veränderungen, die bei der Grammatikalisierung eine Rolle spielen, lassen sich weiter zerlegen. So könnte man sagen, auch dies sei weiter nichts als ein Epiphänomen der Wandlungen, die den semantischen Aspekt eines sprachlichen Elements betreffen (metaphorische und metonymische Prozesse, Inferenz, semantische Entleerung und funktionelle Bereicherung). Somit kann man die Grammatikalisierung nur dann als Fata Morgana ansehen, wenn man sie extrem schematisch darstellt — womit man aber nichts Wesentliches über sie aussagt.

Wenn man berücksichtigt, dass die Grammatikalisierung mehrere oder sogar alle Sprachebenen betreffen kann, muss man bemerken, dass — von dem der Grammatikalisierung unterworfenen Element her betrachtet — jede Grammatikalisierung ein spezielles Zusammentreffen, eine individuelle Konfiguration ihrer Teilprozesse ist. Die oben gezeigten Abbildungen zeigen notwendigerweise nur eine Perspektive der Grammatikalisierung, stellen also das Wesen des Prozesses nicht dar und können ihn somit auch nicht ausreichend erklären.

### 2.1.3. Die Neudefinition von Grammatik und Grammatikalisierung — Hopper

Hopper, ein Anhänger der auf dem Diskurs basierenden Forschungen (wie auch Traugott, die aber weniger radikal ist), bezweifelt die Möglichkeit der Untersuchung von Sprachveränderungen und somit der Grammatikalisierung aufgrund eines anderen Gesichtspunktes. Aufgrund der Zusammenhänge zwischen der Organisation des Diskurses und der Grammatik hält Hopper die grammatischen Regeln nicht für vorher festgelegte Bestandteile der Konversation, sondern vielmehr für Strategien, die während der Interaktionen zustande kommen. Deshalb nennt er sie „emergent grammar“ (Hopper 1998, zit. von Ladányi 1999, 130; vgl.: die Bestandteile der Grammatik fluktuieren, es verändert sich jeweils ein anderer Teil, das heißt „Grammatiken sind immer unfertig," Lichtenberk 1991, 76). Von diesem Standpunkt aus betrachtet ist Grammatikalisierung nichts weiter als eine Bewegung in Richtung Struktur infolge einer Konventionalisierung der während des Diskurses entstandenen Muster (Hopper 1998, ebd.). Dies scheint Dahls Behauptung zu ähneln, nach der die sekundären, also die Relationsbedeutungen durch Konventionalisierung der Konversationsimplikaturen entstehen, also während der Grammatikalisierung im Grunde konventionalisierte Implikaturen entstehen (Dahl, zit. von Hopper–Traugott 1993, 75; s. Dahl 1999, 20). Man kann aber auch eine Verbindung zu Lichtenberks Vorstellung herstellen, der meint: „Grammars shape discourse, and discourse, in turn, shapes grammars" (ebd. 76). Ich sehe bei Hoppers Behauptung folgendes Problem: Wenn Grammatik während der Konversation im Grunde genommen immer und immer wieder neu entsteht, also keine vorher festgelegten Kategorien hat, wie kann man dann von Konventionalisierung sprechen? Letztere hat zur Folge, dass sehr wohl eine Art von Grammatik zustande kommt, auch wenn einige ihrer Bestandteile sich noch verändern. Es verhält sich also viel eher so, dass in der Sprache sowohl festgelegte als auch weniger festgelegte Kategorien existieren, deren Beziehung zu einander sich ebenso wie ihre „Festgelegtheit" kontinuierlich ändert. Somit **existiert** also eine Grammatik.

Hoppers Ansicht nach kann Grammatikalisierung nicht von anderen sprachlichen Veränderungen unterschieden werden, weiterhin kann man sie nicht typologisieren (Hopper 1991, 19), denn wenn Grammatik nicht in klare Einheiten und die Beziehungen dieser zu einander zu unterteilen ist — und das ist sie nicht—, dann sind auch die Veränderungen, die diese Einheiten betreffen, nicht zu identifizieren. Fälle von Grammatikalisierung könnten also nur in Relation zu einer stabilen Grammatik (mit von vornherein bestehenden Kategorien) bestimmt werden, doch es gibt keine sichere Methode zur Unterscheidung zwischen grammatischen und lexikalischen Phänomenen (ebd.). Demzufolge arbeitet Hopper nur auf der Basis von Bedingungen, Hypothesen und Prinzipien und hält Veränderungen eines Elements für — nachträglich — erschließbar.

Anscheinend entspringt die Hauptmotivation Hoppers für seine Vorstellung einer besonderen Eigenschaft der Sprachveränderungen, nämlich ihrer Unvorhersagbarkeit. Sprachliche Veränderungen kann man niemals vorher angeben, man kann sie nur nachträglich entdecken. In der Synchronie gleichzeitig existierende Varianten weisen auf Veränderungen hin, die gerade im Gange sind, und sind zugleich Keimzellen neuer Veränderungen, aber welche Variante eine gewisse Entwicklungsstufe oder gar den Endpunkt der Entwicklung erreicht, kann man nicht sagen. Natürlich kann man Tendenzen aufzeigen, die typischen Routen, denen die jeweilige Einheit folgen wird — **wenn** sie grammatikalisiert, aber dafür gibt es keine Garantie. Dass man dennoch nicht nur im nachhinein Wesentliches über die Veränderungen sagen kann, ist der Tatsache zu verdanken, dass man aufgrund der typischen Ergebnisse des Prozesses sowie der in der Synchronie existierenden Varianten und ihrer Beziehung vieles erschließen kann (zu den Ergebnissen s. Lichtenberk 1991, 37–80, der von prototypischen Konsequenzen spricht). Die Nutzung der Synchronie in der sprachgeschichtlichen Forschung ist nicht neu (s. die italienischen Neolinguisten, z. B. Bonfante, Bartoli; Zsilka 1982; Benkő 1988; Horváth–Ladányi 1993). Aus den Formen, die in der Synchronie zusammen existieren und verschiedene Entwicklungsstufen repräsentieren, „kann man eine Entwicklungsabfolge rekonstruieren, die höchstwahrscheinlich im Wesentlichen analog zu dem realen historischen Prozess ist, während dem die untersuchten Formen entstanden sind" (Horváth 1998, 259; vgl. Ladányi 1998, 422).

Hoppers Ansichten sind trotzdem von großer Wichtigkeit, da sie auf die Schwierigkeit der Trennung von grammatischen Kategorien und ihrer Ursachen verweisen. Bei sprachhistorischen Forschungen steht man oft vor dem Problem, dass die Klassifikation der analysierten sprachlichen Einheit fast unmöglich ist, weil die Kategorien der „Sprache" nicht diskret sind und die Grammatikalisierung keine Reihe von Sprüngen, sondern ein Kontinuum mit fließenden Übergängen ist.

## 2.2. Der Begriff der Grammatikalisierung

### 2.2.1. Mögliche Methoden zur Untersuchung der Grammatikalisierung

Gewisse Sprachveränderungen kann man auch beim alltäglichen Sprachgebrauch bemerken, andere dagegen bleiben den einer bestimmten Generation angehörenden Sprechern einer Sprachgemeinschaft gänzlich verborgen. Einige Veränderungen vollziehen sich nämlich so langsam, dass ihre Wirkung erst nach vielen Jahrhunderten zu Tage tritt. Das gilt auch für die Grammatikalisierung. In ihrer Natur liegt außerdem, dass sie uns oft täuscht, denn die Entstehung einer grammatischen Kategorie oder eines grammatischen Morphems registrieren wir nachträglich, und es ist schwer festzustellen, wann und wo der Punkt war, ab dem sie/es schon als grammatische Einheit zu betrachten ist. Die Benutzung der Kategorie (und die Tatsache, dass sie zum Bestandteil der Grammatik der Sprecher wird) weckt die Vorstellung eines plötzlichen Auftauchens. In Wirklichkeit aber ist die Entstehung grammatischer Elemente immer das Ergebnis eines langen Prozesses, die Folge ständiger

Veränderungen und des ständigen Wettstreits der Varianten. Deshalb kann man feststellen, dass die Grammatikalisierung — wie alle Prozesse des Sprachwandels — graduell ist, kontinuierlich, so dass ihre Aufteilung in Abschnitte lediglich — wie Ladányi es ausdrückt — „eine Taktik der Beschreibung" ist, die das Sprachmaterial „handlicher" macht (zur Verwechslung von mentalen und sprachlichen Kategorien vgl. Huffman 1996).

In erster Annäherung ist Grammatikalisierung ein Sprachwandel, in dem die grammatischen Kategorien entstehen — sich im Grunde die Grammatik einer Sprache herausbildet—, die sich dann weiter entwickeln und differenzieren. Der Begriff kann jedoch außer dem Sprachwandel auch eine Art sprachlicher Betrachtungsweise bezeichnen (vgl. Hopper–Traugott 1993, 1–2). Die Fachliteratur kann man danach aufteilen, wie und als was für eine Erscheinung der Sprachhistoriker die Grammatikalisierung untersucht; die markanteste Grenzlinie verläuft zwischen der synchronen und der diachronen Richtung. Es ist auch eine an diese anknüpfende, aber feinere Abgrenzung möglich: Die Sprachwissenschaftler, die überwiegend die kürzere Form „grammaticization" benutzen, sehen in „grammaticalization" — als Opposition zur ersteren — vor allem eine „Grammatisierung", das heißt den Eintritt eines Elements in die Grammatik. In diesem Sinne betrachten sie die „grammaticalization" als Ergebnis, während ihr eigener Terminus den gesamten Prozess bezeichnet, in dem die Elemente der Grammatik entstehen. Ihrer Meinung nach verpflichtet diese Betrachtungsweise den Sprachwissenschaftler nicht, in der Grammatik eine vorgegebene Entität zu sehen (s. Hopper 1991; Hopper–Traugott 1993, xv–xvi; Rubba 1994; s. auch unten). Die Trennung zwischen synchroner und diachroner Partei scheint sich jedoch (auch) in den jüngsten Forschungen zur Grammatikalisierung zu lockern, denn die panchrone Anschauung und die so genannte dynamische Synchronie charakterisieren nicht mehr ausschließlich die kognitiven Linguisten (z. B. Horváth–Ladányi 1993; Bybee et al. 1994, 248–61). Traugott zum Beispiel verknüpft in ihren Abhandlungen die historische Methode — die unter Einbeziehung der historischen Typologie hauptsächlich die Entstehungspfade der grammatischen Formen untersucht — mit der synchronen Anschauung — die in der Grammatikalisierung vor allem eine syntaktische beziehungsweise semantisch-pragmatische Erscheinung sieht und ihre Abbildung in der Synchronie untersucht (Traugott 1995, 2000). Mehrere Sprachwissenschaftler sind der Meinung, dass diese zweite Methode auch für die ungarischen Forschungen zur Grammatikalisierung die geeignetste ist (s. die Analysen von Ladányi 1999 und Haader 2001).

Die Grammatikalisierung als autonomes Forschungsgebiet gewinnt auch in der ungarischen Sprachgeschichte immer mehr an Bedeutung. Es ist bemerkenswert, dass schon vor der großen „Renaissance“ (in den 70er Jahren) ungarische Werke entstanden, die sich im Zusammenhang mit verschiedenen Themen eingehend mit der Grammatikalisierung beschäftigen, und in denen vereinzelt der Begriff Grammatikalisierung („grammatikalizáció“) vorkommt (z. B. Deme 1952, 23; Sebestyén 1965, 187, 192, 201–9). In den historischen Werken versteckt sich die Grammatikalisierung oftmals in Begriffen, die — vor allem semantische — Veränderungen bezeichnen, die ihr zugehören (Metaphorisation, grammatische Polysemie, Bedeutungswandel, Syntagmatisierung, Verblassen, Abstraktion — s. z. B. Balázs 1965, 1966; Rácz 1977), von denen die meisten sich jedoch häufig auf den gesamten Grammatikalisierungsprozess beziehen.

Die Grammatikalisierung wird überwiegend unter die sprachlichen Veränderungen eingeordnet, also als diachrones Phänomen behandelt (das jedoch auch in der Synchronie untersucht werden kann). An dieser Stelle ist es sinnvoll, einige ihrer grundlegenden Eigenschaften zu nennen (die auch später noch zur Sprache kommen):

1. Die wichtigste der allgemein akzeptierten Arbeitshypothesen ist die der Unidirektionalität (Hauptvertreterin der Hypothese ist Traugott, s. 1995, 2–5; 2000, 3, und Hopper–Traugott 1993, 94), die besagt, dass die Grammatikalisierung immer in eine bestimmte Richtung — zur Grammatik hin — erfolgt, aber niemals in die andere.
2. Die Forscher befassen sich meistens eingehender mit der Anfangsphase der Grammatikalisierung, vor allem mit den semantischen Veränderungen, deren Erforschung in letzter Zeit zunehmend pragmatisch und somit wesentlich intensiver geworden ist. Die Dominanz der semantischen Veränderungen charakterisiert vor allem die erste Phase des Prozesses (Rubba 1994, 81; Ladányi 1999, 128, 130–2).
3. Sowohl die Quellelemente/Quellkonstruktionen, die lexikalischen Einheiten mit ihrem jeweiligen (weiter gefassten) Kontext, die als Ausgangspunkt der Grammatikalisierung dienen, als auch ihre Bedeutung und ihre späteren grammatischen Funktionen sind untrennbar mit einander verbunden (die ältere, inhaltliche Bedeutung lebt in irgendeiner Weise in der grammatikalisierenden Einheit weiter und kann zur Komponente ihrer Funktionen werden).
4. Die Quellbegriffe stammen von vornherein aus einem speziellen Bereich (meistens aus dem Grundwortschatz), und ihre Bedeutung determiniert ihre späteren grammatischen Funktionen. Vom anderen Ende (vom stärker grammatikalisierten Element aus) betrachtet resultiert der Vorgang in Funktionen, die keinen Bezug zu einander haben, die viele wegen ih-

rer Abstraktheit nicht mehr als Bedeutung betrachten. Deshalb wird die Grammatikalisierung aus semantischer Sicht oft als Entleerung bezeichnet (s. Givón 1973, zit. von Heine et al. 1991b, 109).

5. Die Grammatikalisierung geht hauptsächlich mit einem Wechsel der Kategorie, genauer der Ebene einher, darin liegt ihr wesentliches Merkmal. Dieser Wechsel kann sich auf Wortklassen erstrecken (z. B. suffigiertes Nomen > Postposition > Suffix) und führt meist dazu, dass das betreffende Element — früher oder später — zu den Beziehungselementen wechselt. (Die Postposition ist schon ein Verhältniswort, das suffigierte Nomen hat — neben seiner Begriffsbedeutung — durch das Suffix auch eine Beziehungsbedeutung.) So kann das Verschwinden der Begriffsbedeutung keinesfalls als Verlust bewertet werden (vgl. Sweetser 1988, the Loss and Gain model, zit. von Heine et al. 1991b, 110). Alle adverbialen Funktionen beispielsweise haben sich aus adverbialen Bestimmungen des Ortes entwickelt, weshalb man nicht von einer Verarmung sprechen kann. Im Gegenteil: die Veränderung beeinträchtigt zwar das Lexikon etwas, bereichert die Grammatik aber sehr.

### 2.2.2. Die Definition der Grammatikalisierung

Aufgrund des bisher Gesagten ist die Grammatikalisierung als Gesamtheit von sprachgeschichtlichen Prozessen zu betrachten, in denen Lexeme, die zuvor keine grammatische Funktion hatten, eine solche erhalten, und in denen eventuell weitere grammatische Funktionen entstehen. Von diesem Wandel können nicht nur Lexeme betroffen sein, auch kleinere (auf der Phonem- oder Morphemebene) und größere sprachliche Einheiten (Wortfolge, Sätze) können eine Grammatikalisierung durchlaufen. Diese weiter gefasste Auffassung erlaubt zugleich, dass man alle Phänomene als Grammatikalisierung betrachtet, bei denen ein Wechsel aus dem Lexikon in die Grammatik erfolgt, weiterhin Veränderungen, bei denen sich die Beziehung zwischen Konstruktionen oder Sätzen verändert, genauer gesagt enger wird (z. B. die Entstehung untergeordneter Sätze aus freien Diskursstrukturen; die Entstehung von suffixregierenden Postpositionen, die Entstehung von verknüpften Adverbien aus attributiven Adverbialkonstruktionen). Daraus folgt, dass es mehrere Arten der Grammatikalisierung gibt.

Im Folgenden bespreche ich in erster Linie die Art der Grammatikalisierung, bei der aus einem Lexem ein grammatisches Morphem entsteht.

## 2.3. Die Phasen der Grammatikalisierung und die grammatischen Funktionen

Traugott beschreibt die Grammatikalisierung als einen Prozess mit zwei Phasen. Dementsprechend kann man zwei ziemlich verschiedene Typen des Prozesses unterscheiden (s. Traugott 2000, 8).

Bei der primären Grammatikalisierung wird in einer charakteristischen morphosyntaktischen Umgebung aus einer lexikalischen Kategorie eine funktionelle. Bei der sekundären werden die bereits entstandenen funktionellen Kategorien noch gebundener. (Darüber kann geteilter Meinung sein, meiner Ansicht nach ist das Hauptmerkmal der zweiten Phase zunächst die funktionelle Bereicherung und dann die Teilung in neue Kategorien.) Die zwei Typen lassen sich auf einer Zeitgeraden verbinden, der sekundäre folgt dem primären. (Die grammatikalisierenden Einheiten müssen aber nicht beide Phasen durchlaufen.) Traugotts Theorie ist im Grunde eine Weiterentwicklung der klassischen Definition von Kuryłowicz 1965, s. bei Heine et al. 1991b, 10).

Die Natur des an der sekundären Grammatikalisierung teilnehmenden Elements weicht meiner Ansicht nach bedeutend von dem in der primären ab: Darüber hinaus, dass es seine früheren Merkmale verliert, erlangt es mit der Zeit neue. Für den Ausdruck der Tempora des Verbs entstehen in den einzelnen Sprachen meist mehrere Konstruktionen (im Ungarischen z. B. stehen für die Zukunft unter anderem folgende Möglichkeiten zur Verfügung: Präsensform des Verbs; Konstruktion mit dem — aus einem Verb mit konkreter Bedeutung grammatikalisierten — Hilfsverb *fog*; Konstruktion mit dem Partizip Instans: *Felsorolta az* ***elintézendő*** *feladatokat* 'Er hat die zu erledigenden Aufgaben aufgezählt'). Von diesen kann im Laufe der Jahrhunderte die eine oder andere aus der Grammatik herausfallen (wie dies im Ungarischen beim Partizip Futur mit dem Suffix *-and*/*-end* der Fall war) oder neben einander bestehen. Die Voraussetzung dafür ist jedoch, dass sie eine klar differenzierte (mindestens stilistische) Funktion haben. Meiner Meinung nach handelt es sich dann (in der zweiten Phase der Grammatikalisierung) bereits um einen dem in der primären Phase entgegensetzenden Prozess. In der ersten Phase sucht sich eine (in der Regel neue) Funktion eine Form unter den bereits existierenden Elementen des Lexikons, in der sekundären hingegen kommen zu einer schon dauerhaft bestehenden Funktion neue Formen und Funktionen hinzu, wobei die eine oder andere frühere Form auch ausgetauscht werden kann. Zusammenfassend:

**Phase 1:** Aus zuvor nicht grammatischen Einheiten werden grammatische. Die im Repertoire der Sprache vorhandenen Einheiten nehmen in bestimmten Situationen (im entsprechenden Kontext) eine neue Funktion an, so dass zu ihrer früheren Funktion eine weitere hinzukommt. Dadurch entsteht langsam eine Asymmetrie zwischen Form und Funktion, also eine Polysemie. Im Laufe der Entwicklung behalten die Lexeme meist ihre ursprüngliche Bedeutung, während sie in einer anderen Richtung grammatikalisieren (z. B. Substantiv *kor* 'Lebensalter, Alter, Zeit' und Suffix des Temporaladverbs *-kor* 'um, zur Zeit von').

**Phase 2:** Die nunmehr grammatische Einheit grammatikalisiert weiter, sie entwickelt eine neue Funktion (oder mehrere) (z. B. die Weiterentwicklung der Ortsadverbialsuffixe zu Adverbialsuffixen mit abstrakterer Bedeutung). Diese Entwicklung hat klar umschriebene Arten, Richtungen und Schritte. Um ein und dieselbe Funktion können gleichzeitig mehrere Formen konkurrieren, und ob sie bestehen bleiben, hängt davon ab, ob sie eine eigene Funktion erhalten. Während wir es in der ersten Phase mit Polysemie zu tun haben, geht es in der zweiten meistens um grammatische Synonymie. Es kann vorkommen, dass die Funktion selbst aus der Sprache verschwindet.

Der zweiten Phase wird in den Forschungen zur Grammatikalisierung meist weniger Aufmerksamkeit gewidmet, obwohl die Untersuchung des Verschwindens von Funktionen, grammatischen Kategorien sowie der letzten Phase des Jespersenschen und des Meilletschen Zyklus ein wichtiges Forschungsgebiet wäre (s. Károly 1980). Obwohl man das Nullmorphem für den letzten Punkt des Zyklus hält, ist das Verschwinden meiner Meinung nach ein wichtigeres Kriterium der Beendigung des Prozesses, da manche Elemente nicht den gesamten Grammatikalisierungsprozess durchlaufen und es auch vorkommt, dass sie nicht ganz am Anfang in ihn eintreten (s. oben). Das Verschwinden setzt kein Nullmorphem voraus, denn auch eine mehrsilbige Form kann aussterben.

## 3. Eine Art der Entstehung von Adverbialsuffixen im Ungarischen

Im Folgenden untersuche ich die möglichen Wege der Entstehung des Adverbialsuffixes *-val/-vel*. Dieses Suffix habe ich gewählt, weil sein Ursprung nicht vollkommen geklärt ist. Bei der Besprechung versuche ich, anhand der Grammatikalisierungstheorie und der früheren sprachgeschichtlichen Forschungen eine Lösung zu finden.

### 3.1. Die Problematik des Suffixes *-val*/*-vel*

Schwierigkeiten gibt es in erster Linie hinsichtlich der Entstehung des Suffixes. Den früheren sprachgeschichtlichen Untersuchungen zufolge entstand es — da es ein umfangreicheres Suffix ist — aus einem selbstständigen Wort (des uralten finnisch-ugrischen Erbes), einem suffigierten Suffix oder einem Adverb über das Stadium einer Postposition (Stamm + primäre Endung), ebenso wie viele ähnliche Elemente (Korompay 1991, 284–318). Diese Entwicklung kann man als Entsprechung eines allgemeinen Grammatikalisierungsablaufs betrachten, und zwar dem der Entstehung von Affixen aus Substantiven (s. Hopper – Traugott 1993, 105). Diese Abläufe der Grammatikalisierung kann man aufgrund der kontrastiven Untersuchungen sowie der Hypothese der Unidirektionalität und der Quelldetermination als universal betrachten. Deshalb kann sie bei der Rekonstruktion der Quellkonstruktionen und der Entwicklungsstufen als Methode angewandt werden (s. Bybee et al. 1994, 18).

Da weder das Quellwort, aus dem das Suffix entstanden ist, bekannt ist (anders als bei *-kor*, wo das auch heute existierende Substantiv *kor* 'Alter, Zeit' als Anhaltspunkt diente), noch die die klitische Position einnehmende Postposition, kann das Element auch anders entstanden sein, und zwar aus einem primären Suffix. Für diese Möglichkeit sprechen auch die zahlreichen Formvarianten des Suffixes: *-val*/*-vel* kommt in den vier ältesten Sprachdenkmälern des Ungarischen in 4 verschiedenen Varianten vor (*-val*/*-vel*, *-hal*/*-hel*, *-al*/*-el* und als Geminata, z. B. *scegegkel* 'mit Nägeln'). Dieser instabile Sprachgebrauch rührt mit großer Wahrscheinlichkeit von dialektalen Unterschieden her (Korompay 1991, 309).

Den Unterschied zwischen den beiden Entwicklungsmöglichkeiten kann man auch als Parallele zum Unterschied zwischen den Phasen der Grammatikalisierung auffassen. Wenn wir es mit sekundärer Grammatikalisierung zu tun haben, sind die Modalitäten der Weiterentwicklung der einzelnen primären Suffixe schon eine innersprachliche Angelegenheit des Ungarischen, und wir müssen uns nach anderen Mitteln umsehen. Wenn eine Entwicklung aus einem selbstständigem Wort vorliegt, ist dies als primäre Grammatikalisierung anzusehen, und man kann die Ergebnisse der allgemeineren Untersuchungen zur Grammatikalisierung anwenden. (Beispiele aus den verwandten Sprachen können aber in beiden Fällen sehr hilfreich sein!). Sehen wir uns also beide Möglichkeiten an.

### 3.1.1. Innere Entwicklung: Entstehung aus einem primären Suffix

Nach dieser Annahme ist die Basis des Suffixes *-val*/*-vel* das Ablativsuffix *-l*, das, ergänzt durch den vorangehenden Stammendvokal, die in den Sprachdenkmälern vorkommenden Formen ergibt. Die Verwendung des *-l* für diese Funktion wird durch seine Funktion als Junktiv- und Instrumentaladverbialsuffix in den mit dem Ungarischen verwandten Sprachen untermauert. Der Beginn mit *-v* lässt sich damit erklären, dass das Sprachgefühl das *-v-* aus den Formen *teveled*, *ővele* 'mit dir, mit ihm/ihr' usw. dem Adverb hinzugefügt hat. In diesem Fall ist das *-v* also ein Hiatustilger (s. TESz., 1110). Das Problem dieser Annahme liegt darin, dass sie die Entwicklung des Adverbialsuffixes scharf von der des Pronominaladverbs (*velem*, *veled*, *vele* 'mit mir, mit dir, mit ihm/ihr' usw.) trennt, obwohl ihre Funktionen parallel und ihre Formen „identisch" sind. Nach der Meinung der Autoren des TESz. ist auch nicht nebensächlich, dass „unsere älteren umfangreicheren Adverbialsuffixe im allgemeinen nicht durch Suffixanhäufung (oder durch Ergänzung), sondern durch Verkürzung aus einem selbstständigen Wort entstanden sind" (ebd.). Diese Art der Grammatikalisierung kommt so markant zur Geltung, dass sie auch als Argument dienen kann. Diese Entwicklung widerspricht also der Entstehung der umfangreichen Suffixe.

Die Argumente gegen die Entstehung aus einem selbstständigem Wort sind folgende: starke morphologische Schwankungen (die auch von Hiaten herrühren können), identische Funktion des *-l* in den verwandten Sprachen, der phonetische Widerspruch („infolge der Spirantisierung und Vokalisierung des aufgrund der Wörter der verwandten Sprachen anzunehmenden **-k* im Wortinneren wäre im Ungarischen nämlich eher eine Form *-vél*/*-vál* mit langem Vokal zu erwarten" — Lakó 1978, 682).

### 3.1.2. Aus einem selbstständigem Wort

Die Ableitung aus Postpositionen (selbstständigen Wörtern) basiert auf zwei Hauptargumenten:

1. Wenn es ein paradigmatisches Äquivalent des Suffixes unter den personalpronominalen Adverbien gibt (die ursprünglichere Form des Suffixes ist die, deren Lautform im Paradigma vorkommt), ist es aller Wahrscheinlichkeit nach aus einer Postposition entstanden. Diese Hypothese basiert darauf, dass die Entwicklung des Nomens/Adverbs in zwei Richtungen ging: zum einen wurde es zur Postposition und dann zum Suffix; zum anderen blieb es ein Adverb (vgl. Punkt 2). Die Sprachgeschichte sieht in der Existenz eines solchen Paradigmas den unwiderlegbaren Beweis des

postpositionalen Ursprungs, da diese Reihe (der Pronomialadverbien) nur aus einem selbstständigen Wort abzuleiten ist. Für *-val*/*-vel* gibt es ein solches Äquivalent: *velem*, *veled*, *vele* 'mit mir, mit dir, mit ihm/ihr' usw.

2. Wenn das selbstständige Wort nachzuweisen ist (z. B. *bél* 'Darm' als Basis der Suffixfamilie *-ba*/*-be*, *-ban*/*-ben*, *-ból*/*-ből*, die die innere Ortsrelation ausdrückt), aus dem das Suffix über das Stadium der Postposition entstanden ist. Meistens kann man jedoch nicht mit Sicherheit sagen, ob das hypothetische Wort wirklich der Ausgangspunkt für das Suffix war (was auch hier mit dem Suffix *-val*/*-vel* der Fall ist). Die Ungewissheit kann auch aus dem Alter des Suffixes oder der Zweifelhaftigkeit der Lautveränderungen resultieren usw.

Die beiden obigen Anhaltspunkte können auch durch typologische und strukturelle Gründe ergänzt werden, die ebenfalls für die Entstehung aus einer Postposition sprechen:

(i) Wortstellung: in der uralischen Wortstellung geht die Ergänzung dem Bezugselement voraus.
(ii) Die Hauptbetonung liegt auf der ersten Silbe.
(iii) Es ist eine Eigenheit der ugrischen Postpositionskonstruktionen, dass sie an eine Substantivform mit Nullsuffix anknüpfen (es gibt kein körperliches Morphem an der Strukturgrenze).

Postpositionen entstanden im Ungarischen nach zwei Hauptarten. Nach der weiter verbreiteten Ansicht entwickelten sich die meisten aus (unbezeichneten) Possessiv- (oder anderen Attributiv-) Konstruktion, in denen die Postposition das Bezugselement war und im Sinne des oben Gesagten nachgestellt und unbetont war (z. B. *ház* + *belen* 'a háznak a belsejében; im Inneren des Hauses' — Zsilinszky 1991, 443). Die andere Auffassung leitet einen Teil der Postpositionen aus Adverbien ab (es gibt nur wenige solche Postpositionen im Ungarischen, und alle verlangen ein Suffix, s. Sebestyén 1965, 190–9). Den Unterschied zwischen den beiden kann man in der Zeitdifferenz und in der Umwertung des Syntagmas identifizieren. Als Adverb bezog sich das Element auf das Verb, sein Bezug zum Nomen wurde erst später, als es bereits eine Postposition war, zum primären. „In diesem Fall fügte sich die Verbindung von Nomen und Postposition erst nachträglich in ein aus einem der Syntagmen vererbtes morphologisches Strukturmuster ein, und zwar meist in das possessivische" (Sebestyén ebd. 191, weitere Entstehungsarten s. ebd. 190–9).

Ein wichtiger Punkt bei der Herausbildung der Suffixe ist die Entstehung der Postpositionskonstruktion, weil es durch die Unbezeichnetheit, die Nachstellung und die Unbetontheit möglich wurde, dass die Postposition sich dem vorgestellten Nomen schrittweise näherte, daran agglutinierte — also sich zum Suffix zu entwickeln begann. Dass es ein Suffix war, beweist die in den frühesten ungarischen Sprachdenkmälern (aus der altungarischen Zeit) belegte Einsilbigkeit, seine Vokalharmonie mit dem Nomen, das Zusammenschreiben und die zunehmende Unbetontheit.

Die Argumente für die Ableitung aus einem selbstständigen Wort sind folgende: das Alter des Suffixes, seine Häufigkeit (die häufigsten Postpositionen werden am ehesten zu Suffixen, s. Sebestyén 1965, 236) und das Paradigma seines Pronomialadverbs. Die vielen Formvarianten lassen sich mit ihrem Alter erklären: Da *-val*/*-vel* schon sehr früh zum Suffix wurde, konnte schon das Suffix Varianten haben (und dabei konnte das *-v* verschwinden). Interessanterweise kann man auch das Fehlen des Grundwortes und der Klitisierung als Argument betrachten, da „das Veralten des Grundwortes die günstigste Voraussetzung für die Entwicklung zum Suffix darstellt“ (Bárczi et al. 1967, 408–9).

Obwohl das Grundwort, das als Basis des Suffixes diente, nicht bekannt ist, kann mit Hilfe der verwandten Sprachen sowie jener Sprachen, mit denen das Ungarntum lange zusammengelebt hat (z. B. Türkisch), eine mögliche Form erschlossen werden. Mögliche Quellen von *-val*/*-vel* sind:

(i) Das TESz. nimmt eine Form *véle* an (im Paradigma des Pronomialadverbs ist die palatale Form die ältere). In *-vel* ist das Ablativsuffix *-l* zu erkennen, und *ve-* ist wahrscheinlich uraltes Erbe, das vermutlich mit Lexeme aus den verwandten Sprachen in Verbindung gebracht werden kann (s. finnisch *väki* 'Kraft, Menschenmenge, Mann, Macht', estnisch *vägi* 'Kraft, Macht' usw.). Die erschlossene finnisch-ugrische Grundform lautet **βäke* 'Kraft'. Das Suffix lässt sich also folgendermaßen gliedern: *erő* + *-l* 'erővel; mit Kraft'. Das einzige Gegenargument ist, dass die sprachliche Daten gegen die (Laut)Entwicklung *véle* > *vele* sprechen (vgl. Lakó 1978, 681–3), wobei die erstere Form die frühere ist. Derselben Meinung ist auch das EWUng., das folgende erschlossene Form nennt: **βel*/**βal* 'Kraft'.

(ii) Das TESz. erwähnt noch den Versuch, eine Verwandtschaft mit dem finnischen Wort *veli* 'Freund, Bruder' nachzuweisen, lehnt diese jedoch ohne Begründung ab.

(iii) Nach der Meinung von Simonyi (1898, 1905) und Budenz (1864) besteht eine Verbindung des ungarischen Suffixes mit dem tscheremissischen *βel*/*vel* 'oldal, táj, fél; Seite, Gegend, Hälfte'.

(iv) Budenz (1864) wirft noch eine Möglichkeit auf: die Beziehung zu dem mordwinischen Wort *pal*/*pel* 'fél; Hälfte'. Im TESz. finden sich zahlreiche weitere Beispiele mit ähnlicher Bedeutung: das syrjänische *pęl* 'oldal, két összetartozó dologból az egyik; Seite; eins von zwei zusammengehörigen Dingen', das wotjakische *pal* 'oldal, táj, világtáj, időszak, napszak, valaminek a fele, két összetartozó dologból az egyik; Seite, Gegend, Himmelsgegend, Zeitraum, Tageszeit, die Hälfte, eins von zwei zusammengehörigen Dingen' usw. (ebd. 372).

(v) Das CzF. leitet das Suffix aus dem ungarischen Wort *fél/fel* 'Hälfte, halb' ab. Diese Theorie ist jedoch wegen der äußerst ungewöhnlichen Lautentwicklung ($f > v$) unwahrscheinlich, obwohl auch ein Lautwechsel vorstellbar ist (da das Suffix — nach dieser Konzeption — das Resultat einer ausschließlich inneren, selbstständigen Entwicklung ist). Ein weiteres Gegenargument könnte sein, dass wir aus dem Wort *fél* auch eine bis heute existierende Postposition(sfamilie) ableiten: *felől felé felett.*

(vi) Das CzF. erwähnt auch die Möglichkeit des türkisch-uigurischen Ursprungs: türk. *ile*, *bile* '-vel; mit'. Diese Konzeption lehnen die meisten Sprachwissenschaftler ab.

## 3.2. Die Funktionen des Suffixes

Die Funktionen von *-val/-vel* waren schon in der altungarischen Zeit beachtenswert, deshalb bestand die Polysemie des Suffixes vermutlich schon seit der urungarischen Zeit. Aufgrund des Zusammenhangs zwischen Funktionsreichtum und Häufigkeit musste ein Suffix häufig sein, um mehrere Funktionen zu erlangen. Die für die ungarischen Adverbialsuffixe charakteristische starke Polysemie ermöglichte schon sehr früh die Aufstellung eines Systems aus sehr wenigen Elementen; diese Tendenz ist auch später zu beobachten.

Die Hauptfunktionen von *-val/-vel* im frühen Altungarischen waren (s. Korompay 1991, 314–5): junktive Adverbialbestimmung, die Umstandsbestimmung des Mittels (Instrumentalis), der Art und Weise und des Grundes. Außerdem kamen noch einige komplexe adverbiale Funktionen hinzu (z. B. die Umstandsbestimmung der Art und Weise und des Mittels).

In der späten altungarischen Zeit auftretende neue Funktionen von *-val/-vel* (s. Korompay 1992, 393–4): die Umstandsbestimmung des Zustandes, des Maßes und der Hinsicht. Wie man sieht, hatte das Suffix schon im frühen Altungarischen (also vor 800 bis 1000 Jahren) ziemlich viele Funktionen, was für alle ursprünglich als adverbiale Bestimmungen des Ortes gebräuchlichen Adverbialsuffixe des Ungarischen charakteristisch ist. Der Ausgangspunkt der Funktionsentwicklung von *-val/-vel* war wahrscheinlich das primäre

Ablativsuffix *-l*, das — wie bereits erwähnt — in beiden Auffassungen zum Ursprung dieses Suffixes vorkommt.

### 3.3. Konklusionen bezüglich der Geschichte des Suffixes

Aufgrund des Vergleichs der oben behandelten zwei Ableitungen unter einander und mit den Forschungen zur Grammatikalisierung stelle ich Folgendes fest:

1. Für die Ableitung von *-val*/*-vel* aus einem selbstständigen Wort kann man einerseits mehr und andererseits gewichtigere Argumente vorbringen als dagegen. Es ist eine andere Frage, welchen Ursprungs das Grundwort ist, doch sind in mehreren verwandten Sprachen Lexeme erhalten, die man mit den Antezedenzien des Suffixes in Verbindung bringen kann. Trotzdem sprechen sich die meisten ungarischen Sprachhistoriker für einen uralten Vorläufer aus (s. Budenz, Hunfalvy sowie die Wörterbücher EWUng., TESz. und MSZFE.).
2. Das Hauptargument gegen die Abstammung von einem selbstständigen Wort, die große Zahl der Formvarianten, lässt sich durch die Darstellung einer Entwicklungslinie widerlegen: Es handelt sich nicht unbedingt um einen Hiatustilger. Das Suffix hatte im frühen Altungarischen vermutlich noch die Form *-βal*/*-βel*, in der der bilabiale stimmhafte Spirant in intervokaler Position ausgefallen sein kann, und als Hiatustilger kann auch das *h* gedient haben. Die Formen *-hal*/*-hel* können aufgrund der Analogie auch an Stämme angefügt worden sein, die nicht auf einen Vokal endeten (vgl. HB: *zumtuchel* 'mit euren Augen'). Ebenso lassen sich auch die Varianten mit Hiatus (*-al*/*-el*) und die selteneren mit *-j* (CzF. *kapájje* 'mit Hacke', *ládájje* 'mit Kiste', *vékájje* 'mit Scheffel') erklären. Das Aufeinandertreffen dreier Konsonanten am Stammende führte meistens zum Ausfall (eine seltene Ausnahme ist z. B. HB.: *milostual* 'mit Gnade'; zu allen s. Korompay 1991, 309–10.). Die Verbreitung von *-val*/*-vel* begann im Mittelungarischen, die übrigen Varianten wurden auf die Dialektebene zurückgedrängt oder sind ausgestorben (Korompay 1992, 393).
3. Die Theorie des Ablativsuffixes erklärt nicht das Paradigma von *velem*, *veled* 'mit mir, mit dir' usw.
4. Wie oben bereits erwähnt, spricht außer dem Alter des Suffixes auch seine Körperlichkeit für die Entstehung aus einem selbstständigen Wort. Darüber hinaus kann man auch den Zusammenhang folgender Merkmale hervorheben: die Relation der Polyfunktionalität zum Bedeutungsinhalt

(letzterer folgt aus ersterer), zur Häufigkeit und zur Grammatikalisierung. Der weite Bedeutungsinhalt ist die Voraussetzung für die weitere Grammatikalisierung des Suffixes und die Annahme neuer Funktionen. Die polyfunktionalen Formen sind zugleich häufig (das Umgekehrte trifft nicht unbedingt zu), was fördernd auf die weitere Funktionsbereicherung wirkt. Die Häufigkeit bestimmt meistens auch die Entwicklung zum Suffix: Die häufige Verwendung von Postpositionen hat ihre Entwicklung zu Suffixen begünstigt.

5. Es ist möglich, dass die ursprüngliche Begriffsbedeutung vieler Adverbien/Postpositionen, die der Ortsbestimmung dienten und schrittweise zu Suffixen wurden, auf die Namen von Körperteilen zurückzuführen ist. Interessanterweise haben wir auch im Fall von *-vel* eine Form aus einer verwandten Sprache gefunden (das tscheremissische *βel*/*vel*), die die Bedeutung 'oldal, fél; Seite, Hälfte' hat (vgl. Budenz 1873–1881, 397 und CzF.). Die Forschung über grammatische Morpheme, die auf die Namen von Körperteilen zurückzuführen sind, ist ein populärer Bereich der Untersuchungen zur Grammatikalisierung (s. Rubba 1994; vgl. Zsilinszky 1991, 456: „die Grundwörter der Postpositionen sind meistens selbst positionsbezeichnende Substantive oder Namen von Körperteilen, deren metaphorischer Gebrauch für die konkrete Ortsbezeichnung geeignet ist„). Viele Adverbialsuffixe, Postpositionen und Suffixfamilien des Ungarischen können mit Namen von Körperteilen in Verbindung gebracht werden (die später als Stämme funktionieren), z. B. *mögött* 'hinter (loc.)' (< *mög* 'hát; Rücken'), *mellett* 'neben (loc.)' (< *mell* 'Brust'), *belül* 'in (loc.), drinnen' (< *bél* 'Darm'), *hátul* 'hinten' (< *hát* 'Rücken'), *szemben* 'gegenüber (loc.)' (< *szem* 'Auge'). Die Postpositionen bewahren das Grundwort besser als die Suffixe, in unserem Fall ist die Postposition jedoch verschwunden.

### 3.4. Konklusionen in Bezug auf den Grammatikalisierungsprozess des Suffixes

Die Entwicklung des Großteils der Adverbialsuffixe des Ungarischen aus selbstständigen Nomen und Pronomen mit primären Adverbialsuffixen über das Stadium der Postposition sowie die Herausbildung weiterer, abstrakterer Bedeutungen dieser Suffixe ist eines der bemerkenswertesten Beispiele der Grammatikalisierung. Die folgende Tabelle fasst die charakteristischen Eigenschaften der Elemente, die an der Grammatikalisierung von Adverbialsuffixen beteiligt sind, zusammen.

| NOMEN (+SUFFIX) | POSTPOSITION | ADVERBIALSUFFIX |
|---|---|---|
| Lexem | freies Grammem | gebundenes Grammem |
| freies Morphem | halbfreies Morphem | gebundenes Morphem |
| Grundwortart | Hilfswort | hat keinen Wortartwert |
| kann alleinstehend Satzteil sein: mit Suffix kann es eine adverbiale Beziehung ausdrücken | kann kein Satzteil sein: kann nur zusammen mit dem Nomen eine adverbiale Beziehung ausdrücken | kein Satzteil: es kann nur mit dem Nomen zusammen eine adverbiale Beziehung ausdrücken |
| — | zwischen Stamm und Postposition kann ein freies Morphem stehen | zwischen Stamm und Suffix kann kein freies Morphem stehen |
| offene Klasse | geschlossene Klasse | noch geschlossenere Klasse |
| hat Begriffs- und Beziehungsbedeutung | hat hauptsächlich Beziehungsbedeutung, ihre Begriffsbedeutung ist schwächer als beim Nomen | hat nur Beziehungsbedeutung |
| körperliche Einheit | körperliche Einheit (meistens mehrsilbig) | weniger körperlich (meistens einsilbig) |
| — | hat eine Form, nimmt nicht an der Vokalharmonie teil | hat meistens mehrere Formen (weil es an der Vokalharmonie teilnimmt) |
| seine Position ist nicht gebunden | ihre Position ist gebunden: nachgestellt | seine Position ist gebunden: nachgestellt |
| kann dekliniert werden | hat keine Verwandtschaft mehr mit den Nomina (kann nicht weiter dekliniert werden) | Suffixe schließen das Wort ab, können also nicht weiter gebeugt werden |
| ein Bezugselement kann durch mehrere suffigierte Nomina mit adverbialer Funktion ergänzt werden: *A házban és a földön is aludtak.* 'Sie haben im Haus und auf dem Boden geschlafen.' | auf ein Wort können sich mehrere Postpositionen beziehen: *A ház mögött vagy mellett hagytam.* 'Ich habe es hinter oder neben dem Haus gelassen' | auf ein Wort kann sich nur ein Suffix beziehen: **A házban vagy nál hagytam.*' *Ich habe es im Haus oder an gelassen.' |
| ist meistens betont | ist nicht betont | ist nicht betont |
| — | Richtungsdreiheit ist charakteristisch (soweit möglich) | Richtungsdreiheit ist charakteristisch (soweit möglich) |

Vgl. Klemm (1928–1942, 221–53); Sebestyén (1962; 1965, 9–11; 1991). Sebestyén hält von den Unterscheidungskriterien zwischen Postposition und Adverbialsuffix nur folgende für relevant: Teilnahme an der Vokalharmonie, die Zahl der konstituierenden Morpheme, die Festigkeit der Bindung an den Stamm und die Silbenzahl als Indiz des selbstständigen Wortes.

Anhand der Tabelle kann man Folgendes feststellen (entsprechend der Richtung der Grammatikalisierung zeilenweise von links nach rechts vorgehend):

- In der Entwicklung vom suffigierten Nomen zum Suffix wird aus der lexikalischen Einheit (Lexem) schrittweise eine grammatische Einheit (Grammem), aus morphologischer Sicht wird aus einem freien Morphem ein gebundenes.
- Es ist ein Verlust der ursprünglichen (größeren) Wortartkategorie zu beobachten: Aus einer Grundwortart wird ein Suffix ohne Wortartwert. Diese Dekategorisierung zeigt sich auch darin, dass die Postpositionen und Suffixe nicht mehr über die Merkmale der selbstständigen Wörter — z. B. Beugbarkeit — verfügen.
- Die Satzgliedfunktion verliert sich Schritt für Schritt: Das suffigierte Nomen kann die Satzgliedfunktion alleine erfüllen, die Postposition und das Suffix nicht, im Gegenteil, sie sind Hilfselemente, durch die die selbstständigen Wörter ihre Wortartfunktion erfüllen können. Es ist offensichtlich, dass die Postposition ein organisches Requisit des Nomens ist und nur zusammen mit diesem die Funktion des adverbialen Satzglieds erfüllt. Das suffigierte Nomen in adverbialer Funktion bezieht sich auf das (nominale oder verbale) Prädikat als Determiniertem, ist dessen Ergänzung, die Postposition ist aber gänzlich von dem ihm vorgestellten Nomen abhängig. Im Laufe der Grammatikalisierung erfolgt auch eine syntaktische Abwertung: das suffigierte Nomen ist noch selbstständig, die Postposition nicht mehr.
- Die lexikalische Bedeutung verliert sich schrittweise, während die grammatische kontinuierlich reichhaltiger wird.
- Die Position der Elemente wird immer gebundener, die Suffixe werden nicht vom Wortkörper getrennt, was auch durch die Schreibweise angezeigt wird.
- Aus formeller Sicht erfolgt eine langsame Verringerung der Substanz des Elements: Durch die Grammatikalisierung entwickeln sich Elemente mit immer geringerer Silbenzahl.
- Es erfolgt ein gradueller Verlust der Betonung: Vom Stadium der Postposition an sind die Elemente meistens unbetont.
- Die typologischen Merkmale bleiben bis zum Schluss betont (Richtungsdreiheit und Vokalharmonie erscheinen).
- Das suffigierte Nomen und die Postposition ähneln sich in ihrer Bedeutung, die Postposition und das Suffix in ihrer Funktion.

Hier ist anzumerken, dass die Übergänge zwischen den Wortartkategorien in der Tabelle nicht angegeben sind.

Die in einer Sprache möglichen Veränderungen und die Arten der Entstehung grammatischer Kategorien können aufgrund der Typologie als wahrscheinlich eingestuft oder ausgeschlossen werden. Aufgrund seines agglutinierenden Charakters drückt das Ungarische adverbiale Relationen überwiegend durch Suffixe und Postpositionen und nicht durch Präpositionen aus. Diese Elemente behalten die Richtungsdreiheit in der Regel bei.

Man kann diese als typische Arten der Entstehung von Suffixen im Ungarischen bezeichnen, von denen die bedeutendste die Entwicklung aus selbstständigen Lexemen ist, die folgenden Grammatikalisierungsprozess durchläuft:

Selbstständiges suffigiertes Nomen oder Nomen mit Postposition $>$
Postposition $>$ Adverbialsuffix

Diese Entwicklung lässt sich im Großen und Ganzen mit der oben beschriebenen nominalen Entwicklung in Einklang bringen, meiner Meinung nach gibt es jedoch auch Unterschiede. Das System der nominalen Adverbialsuffixe des Ungarischen ist gegenüber dem indoeuropäischen sehr reich, es verfügt über 20–30 Elemente. Es bildet ein weniger geschlossenes System als das Kasussystem der östlichen indoeuropäischen Sprachen (das System der ungarischen Adverbialsuffixe ist eher ein System von Nominalsuffixen). Lediglich ein aus etwa 9 Elementen bestehendes Teilsystem scheint vollkommen regelmäßig zu sein, ist jedoch so stark nach den Merkmalen der uralischen Sprachen strukturiert, dass man es nicht mit den Kasus der alten indoeuropäischen Sprachen vergleichen kann (vgl. Antal 1961, 86–92).

Ich hoffe, dass aufgrund der obigen Darlegungen deutlich wird, dass die Forschungen zur Grammatikalisierung die früheren historischen Forschungen nicht ersetzen, dass aber die allgemeinen Regelmäßigkeiten mittels ersterer besser ermittelt werden können. Im Idealfall tragen die beiden Methoden zusammen zur Klärung ungelöster Probleme bei und bereichern so die Forschung mit neuen Erkenntnissen.

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# THE MENTAL LEXICON: RESULTS OF SOME WORD ASSOCIATION EXPERIMENTS

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**Abstract**

There are numerous hypotheses concerning the structure, size, and strategies of adults' mental lexicon. This is the first time, however, that children's mental vocabularies are analysed using the technique of free word associations (with the participation of two hundred 12-year-old and two hundred 13-year-old pupils). The analysis focuses on both quantitative and qualitative characteristics of the data like types of associations, lexical representations, distribution of word categories or semantic analysis of words. Comparisons are also made with a very similar material found in the Hungarian literature that provides a unique opportunity to look at the differences of the mental lexicon after 60 years. The discussion concerns (i) the patterns of the tested children's mental lexicon (including the individual performances) and (ii) vocabulary changes seen as a multifactorial consequence of the progress of time. The hypothesis about the speed of lexical access being a definitive factor in the development of the mental lexicon has been confirmed and may be applied to other languages as well.

## 1. Introduction

The size and structure of the mental lexicon is a subject that has been intriguing people for centuries. Numerous hypotheses have been advanced (cf. Gósy 1999b); and modern science, especially psycholinguistics, tries to answer the arising questions by advanced, mainly experimental, methods. In the study of the process of first language acquisition, for instance, it is a central issue how the child's first words come into being and how they are later modified or changed during his/her maturation. How does it happen that the totality of his/her words come to constitute the child's mental lexicon, and how are the lexical representations of those words constructed and stored? Although we have learnt a lot from the accumulated empirical data and the results of relevant experiments, a number of related facts are still unknown and researchers are bound to formulate hypotheses.

Our idea of the time of appearance, articulatory features, and underlying phonological representations of children's first words is fairly accurate (cf. McNeill 1970; Waterson 1987; Steinberg 1993 for Hungarian: Kenyeres 1926;

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Vértes O. 1955; Meggyes 1971; Gósy 1999b). However, there is no consensus among researchers concerning the origin of word meanings in the beginning phases of language acquisition. Theories are sometimes concurrent, but they often exhibit large differences, too (cognitive theory, association theory, probability theory, prototype theory, etc., cf. Berko Gleason 1985). The child's word stock comes about via perception/comprehension, by far antedating production. For instance, a 13-month-old child was reported to understand as many as 50 different words, whereas the same child did not become capable of producing 50 different words until she reached 19 months of age (Benedict 1979). This might suggest that people have two mental lexica, one for production and one for perception; but that situation is not likely to obtain even at the beginnings of language acquisition. It is just a matter of two different uses of the same mental lexicon (neurological arguments and experimental data both support the claim that humans have a single mental lexicon, cf. Coleman 1998). The literature on first words is extensive, but research on what happens to the word stock in later years is rather sparse. It centres around the acquisition of meanings, the phonetic and phonological form of words, and the length of words making up the child's utterances; these are relatively easy to analyse due to the limited number of words at hand. Special experiments are devoted to the investigation of the vocabulary of older children (for instance, the characteristics of the acquisition of parts of speech, or the development of the meanings of function words at various ages).

The size of the word stock does not necessarily exhibit linear correlation with the child's age, and shows rather extensive variation across individuals. On the other hand, the development of the comprehension and production of single concepts is a lot more uniform and regular. Learning a new word does not simply involve the acquisition of the relevant concept (or meaning) but also that of its connections with other items. The most widely accepted assumption is that the acquisition of meaning is primary, whereas the recognition and use of semantic relationships is secondary (McNeill 1970). Indeed, semantic fields are rather late to develop in child language. This observation does not contradict the assumption that, due to a general strategy of language acquisition, lexical items are organised into networks (that assumption being supported by physiological facts about how neurons work). Results of association experiments have confirmed the "cobweb-like" organisation of the word stock even at a relatively early age (Aitchison 1987). That organisation is almost unquestionably a semantic one. At any rate, it appears that children possess some kind of preprogramming with respect to the way newly acquired words are to be stored in their mental lexicon such that they are the most appropriately accessible when needed. The children are able to incorporate the newly identified lexical items in their mental network; but the newcomers are connected to one another and to the items that were present before their arrival a lot more loosely than the latter are to each other.

Research in the past ten years seems to confirm the assumption that the development of children's vocabulary does not only go on in terms of articulatory and acoustic imprints but also by phonological mapping (Ingram 2001). That hypothesis is backed up by the idea that the child's "word stock" based solely on his/her perception of speech and general perceptual abilities is enough for phonological organisation (a prerequisite for the production of the first words) to begin. The large-scale initial development of the production vocabulary is based on the combinability of its items. In other words: the network of the child's mental lexicon begins to be built. This is also supported by the fact that the acquisition of as many as 100 new words a week until a particular child became 22 months old was recorded without noticeable changes in the phonological system of that child during the same period (Ingram 2001). Thus, later development takes the form of increasingly more detailed phonological representations and a more limited number of acquired new words. By the age of three or four, the following points probably characterise the child's mental lexicon: fundamental language specific phonological representations have taken shape, the semantically based network has been structurally completed, storage takes place as in the adult system, and the processes of lexical access approximate those observed with adult speakers.

Adapting Levelt's (1989) speech production model to our present purposes we can say that, in lexical representations, the levels of lemmata and lexemes are fully formed from the very beginning, except that their use may differ between children and adults. With the gradual elimination of children's double (phonetic) storage and a simultaneous increase of their word stock, the lemmatic and lexemic levels get clearly separated. This means that children's lexical access in speech production is characterised by strategies similar to the adult ones (at least from the age of the second biological barrier onwards). It has been experimentally demonstrated that with English-speaking five-year-olds neither the length of words nor their phonemic similarities affect the process of vocabulary access, whereas with seven-year-olds both factors play important roles (Gathercole–Baddeley 1993). The semantic associations of five-year-olds still contained concepts that did not fit the category at hand, but this never happened with seven-year-old subjects. Word activation based on the initial sound sequence was hardly ever possible with four-year-olds, whereas at the age of seven or later children can even access several words satisfying the conditions of the given "rule".

The question repeatedly arises of what size the child's vocabulary may be at the various ages and how much it grows from one age group to another. The initial word stocks of children, despite often very large individual differences, show considerable similarity (Jarovinszkij 1995). The differences are quantitative rather than qualitative (cf. Bakonyi 1918). Some data in the literature suggest that the acquisition of words is relatively slow until 1;6 and that at that point a sharp increase usually begins. A child who only knew 22 words at 1;6, had acquired 118 words by the age of 1;9, a mere three months later (Ingram 2001). Janota (1970) compared her own child's word stock with the data of three other Czech-speaking children, tested by the Czech linguists Ohnesorg and Pačesová. At the same age, the four children had a vocabulary of 500, 921, 1613, and 1913 items, respectively. An analysis of their first 500 words showed that these sets of words included identical items in 48%, respectively 56%, for two pairs of the children (the latter pair was made up by siblings). Comparing all four children, 24% of their 500 words were completely identical. In terms of the estimated size of word stock at 3 years of age, individual variance is, again, large; a summary figure referring to English and German children's data sets the lower limit at 500, and the upper limit at 3600 words. Hungarian children's vocabularies are also given as varying between wide limits: 150–1500 words. For the production vocabulary of thirty nursery-school children (between 3;0 and 3;3) an average of 1256 words was found (Gósy 1984). Ildikó Meixner observed the first appearances of words with eight children until they became three and a half years old; she recorded 260 words from the child that had the fewest, and 1468 words from the one that had the most (Meixner 1976). The elder son of one of the authors of the present paper had 450 words at the age of 2; his word stock was estimated at 1600 words when he was three. If we take that estimate to be correct, then the average frequency of his acquiring new words comes to 3.15 words a day, 22.11 words a week, or 95.83 lexical items per month (of course, the real growth of vocabulary was not necessarily linear). And those figures do not include the acquired morphological units (suffixes), pieces of knowledge concerning the structure of the language (the numerical characterisation of that knowledge being problematic anyway) or pragmatic features. It is clear that that speed of acquisition cannot be consistently upheld for a long time; however, estimations concerning later years are even more vague.

The word stock of 6–7-year-old children is interesting in a number of respects; again, we have to rest content with estimates. According to a figure from 1961, the vocabulary of American children at the age of six averages on approximately 23,700 words (Carroll 1961). Yet other data suggest that a six-year-old American child knows 7800 roots (and 13,000 words) and that his/her vocabulary grows by 14.5 roots (21 words) per day (Lindblom 1999). Accordingly, (s)he knows 10,585 roots and 15,330 words by the time (s)he is eight years old. Rather than commenting on those figures, let us note that the dictionary of the Hungarian writer Mór Jókai's complete works consists of 22,000 entries. However, individual researchers differ in their estimations. Clark (1995) estimates the vocabulary of the average five-year-old American child at 14,000 words, and she thinks that (s)he acquires some 300 new words a year. That means that the word stock of an eight-year-old child should consist of approximately 14,900 words. Tentatively accepting that growth rate, the vocabulary of the Hungarian boy referred to above should have consisted of 3100 words at the age of eight (?). In comparison, the word stock of an American adult is assumed to vary between 75,000 and 150,000 words (Berko Gleason – Ratner 1998, 158). Other estimations say that the 50 most frequent English words make up 60% of conversations, that is, 10–15 words are uttered before one occurs repeatedly. One of the most widely known dictionaries, the *Longman Dictionary of Contemporary English*, containing 55,000 headwords, explains them using as few as 2,000 words. All that is definitely enough to convince us that we know next to nothing about the size of children's (or adults') vocabularies and even the most serious estimations, sometimes based on experimental data, are extremely nebulous.

András O. Vértes set forth the methodological difficulties of establishing children's vocabulary sizes as early as in 1955. It is known that, at any stage of language acquisition, very large differences can be found in the linguistic performance of children. Concerning individual differences in speech perception, there are Hungarian data as well (Gósy 1999b); hence, individual variation in vocabulary size can be safely assumed, too. The primary aim of vocabulary tests known today is not to estimate the number of lexical items used at a given age, but rather to compare the subject's performance to the standard value of the given test and hence the early screening of children who do not perform as expected (e.g., the Peabody vocabulary test or for Hungarian: Lőrik et al. 1995).

Word associations are often used as a method of exploring semantic representations and lexical access. The first known word association experiment was due to Francis Galton (1883) who tested the functioning of word associations, as well as their speed, on himself. The method has three familiar versions. (a) The procedure known as free word association requires that the subject utters the first word that occurs to him/her on hearing a (pre)determined clue. (b) In restricted word association tests, the clue is to be followed by a response of a given category (like its opposite, or a similar-sounding word). (c) In open-ended tests, the subject has to list as many words of a given semantic category (like *animals* or *pieces of furniture*) as (s)he possibly can.

Data obtained from word association tests often shed light on other linguistic phenomena as well. The syntagmatic/paradigmatic shift in language acquisition takes place at around the seventh year in English-speaking children (Berko Gleason–Bernstein Ratner 1998). This means that while younger children tend to activate words in free word association tests on the basis of syntactic relationships (e.g., they respond to the clue *dog* by the verb *bark*), older children and adults remain within the same semantic category (they activate *cat* on hearing *dog*). The fact of the syntagmatic/paradigmatic shift has been explained in a number of ways, and it can also be assumed that, due to certain structural features of the language concerned, the shift takes place at different ages in speakers of different languages.

The **aim of the research** reported in the present paper is a multifunctional analysis of the vocabulary of native Hungarian adolescents. Our experiment is a repetition of one performed in 1939 by János Cser, with a comparison of the data obtained, and their evaluation in themselves and in conjunction. Vocabulary size experiments found in the literature mostly focus on the process of lexical access as part of speech comprehension. On the other hand, an analysis of the results of lexical access activated during speech production may yield a more accurate view of the organisation of the mental lexicon. This claim can be substantiated by the following considerations: (a) In free word association tasks, both the active and the passive aspects of the mental lexicon are activated. (b) The faster the lexical access, the larger number of words can be activated. (c) The larger number of words are available, the easier it is to access them (since there are no linguistic or other rules to restrict the process). (d) The network character of the mental lexicon can be rendered probable in this way. (e) Conclusions can be drawn concerning the way individual linguistic categories are encoded. Finally (f) cautious estimations can be formulated concerning the size of the subjects' word stocks.

We have chosen subjects aged 12–13 because we wanted to make sure that we investigate the characteristics of the vocabulary of the period following what is called the second biological barrier. In addition, this was made possible by the fact that the experiment published in 1939 included children of that age group. Thus, it also became possible to get an idea of which words had become obsolete or arose as new lexical items during the intervening sixty-odd years.

Also, the fact that the two experiments can be compared makes it possible that we observe linguistic changes (and changes in language use) in the field of word stock.

## 2. Method and material

The method we have chosen was a repetition of the version of free word association tests that was employed and described by János Cser in his 1939 book (other references to this particular type of free word associations were not found in the literature). The point of that procedure is that the child is to activate words for 15 minutes without constraints of any kind (the subjects had to write down the words). Cser motivates his choice of that procedure by noting that the data can thus be made use of in three different ways. First, by analysing the number of words produced; second, by gaining insight into the child's way of thinking via exploring the characteristics of the lists of words obtained; and third, by getting a tool for estimating the active vocabulary sizes of the children tested, as well as the frequency of the words occurring in the lists.

In János Cser's experiment a total of 4483 boys and girls were involved; they all came from Budapest and were aged between ten and fourteen years. They were pupils of various kinds of schools: elementary, higher elementary, or secondary. However, the data coming from only 1000 of them (200 in each age group) were taken into consideration. Testing took place under classroom conditions. Although the aim was to elicit free word associations, two restrictions were nevertheless imposed on the procedure: the children had to avoid proper names and suffixed forms. In our own experiment 12 and 13-year-old boys and girls participated (from various parts of the country); sixth- and seventh-formers of primary schools, as well as secondary school pupils of the same ages. Both age groups included 200 children (100 girls and 100 boys), a total of 400 children. They also performed their task during a school class. In giving instructions to them, we did not make any restrictions (thus, they were allowed to write proper names and suffixed forms as well). We recruited our test groups both from Budapest and from other parts of the country. Participants of Cser's experiment had learned to write with oblique strokes, used dip-in pens, and had to observe "neatness" of their writing as was customary in those days. Our own subjects had learned upright writing, used ball-point pens or (rarely) pencils, and neatness was not an aspect of writing that was usually graded in those age groups.

In spite of the minimal amount of deliberate changes and the differences caused by the time elapsed between the two experiments, the series of tests conducted in the autumn of 1999 was comparable to the one that had been conducted more than sixty years beforehand. The word lists that our 400 children wrote were entered in a computer file; the evaluation was performed by one of the present authors (M.K.) using an MS Access database management system and special task programs developed by herself. The statistical analysis was done with an SPSS for Windows software.

## 3. Results

### 3.1. Data from our own corpus

In order to determine the size of our corpus, the first thing we had to do was to define the notion of 'word'. Indeed, free word associations unambiguously suggest that the units stored in the speaker's mental lexicon are but partly characterizable in terms of the notion 'word' as defined in classical grammars. A 'word' can be a stem or a suffixed form, a compound or even a phrase. It is not infrequently difficult to tell the latter two from each other, if we think in terms of grammatical constructs, not in terms of spelling. In addition, a single activation sometimes resulted in accessing a multi-word sequence that had to be considered a unit just as much as a monomorphemic word did. Therefore the type/token differentiation could not be used unambiguously with our corpus. In order to solve the above dilemma, we will refer to the units stored in the mental lexicon as 'mental words' which may correspond to a 'traditional' word in the grammatical sense but may just as well differ from it structurally as well as in their ability to occur as syntactic phrases or indeed as sequences of phrases.

Thus, a mental word is a stored lexical unit as opposed to a lexeme that stands for a single concept as in Levelt's (1989) definition. The lemmatic level of Levelt's speech production process need not detain us here. A lexeme—in Hungarian—is a semantically, syntactically, and phonologically defined form of a concept. (For simplicity, the term 'word' will also be used below as a synonym of 'lexeme'.) The type/token distinction was taken into consideration in two different ways. With respect to the repetitions across (as well as within) children, whereas in 'lexeme' counts each lexeme is counted just once. With respect to individual children's word lists, repeated items count as a single lexeme each but are included in the number of mental words as many times as they occur. Our 12 and 13-year-old subjects wrote a total of 52,764 mental words, of which 289, respectively 250, that is, a total of 539 words were illegible and will be disregarded in what follows (the ratio of illegible items was a mere 1.02%). The corpus then contains **52,225 mental words**, this is what we considered to be 100%. In the analyses, we simplify by taking the average age of sixth-formers to be 12 years, and that of seventh-formers to be 13 years.

The number of mental words activated by sixth-formers was **25,761**, the same number for seventh-formers was **26,464**, the difference being 703 words. The difference can be explained in two ways. First, the more hoped-for explanation is that the size of the mother-tongue mental lexicon differs in this manner between the two age groups or else its use becomes faster and more accurate as time goes by. This would entail that the average difference between 12 and 13-year-olds is the knowledge of 703 words, a value that does not contradict the assumptions in the literature. It cannot be excluded either that the difference between the two age groups is not in the size of their mental lexica but rather in their processes of lexical access. This would mean that access by the older children is faster and more successful, a factor that in turn leads to their association to more numerous words.

The other possible explanation runs as follows. Seventh-formers obviously write faster than sixth-formers do, and this makes it possible for them to keep up with their own activation of their mental lexicon to a larger extent. In this case there need not be an inequality in the number of activated mental words, the difference may be simply due to the speed of handwriting. The analysis of the number of syllables showed that older pupils wrote longer words. The 12-year-old subjects activated mental words of 2.14 (girls) and 2.15 (boys) syllables on average (the scatter was 0.18 for girls and 0.25 for boys). For 13-year-olds the average was 2.22 (girls) and 2.20 (boys) syllables per mental word (the scatter was 0.22 for girls and 0.25 for boys). The age-bound difference is statistically significant, thus we can conclude that the older group activated somewhat longer words. (For comparison: the average length—in number of syllables—of Hungarian monomorphemic dictionary items is 1.94, cf. Papp 1973.)

General experience and the analysis of our data both make us conclude that the surplus is due to the better functioning and more loaded character of the mental lexicon, rather than to the superior writing skills of the older group. Seventh-formers do not write considerably faster than sixth-formers do, and the neatness of their handwriting does not differ much either. Faster lexical access, as well as activations more rapidly following one another, obviously make it possible to access a larger number of words in a given amount of time. The question still is whether this in itself explains the difference of 703 words or the growth of the mental lexicon in a year has to be taken ito consideration as well.

Our 12-year-old subjects activated **4642** different **lexemes**, whereas the 13-year-olds wrote **5280** (discounting proper nouns). The younger ones wrote 1930 lexemes that did not occur in the seventh-formers' material; the older group wrote 2568 that the others did not. The number of lexemes that both groups activated was 2712, that is, 58.42% in the case of 12-year-olds and 51.36% in the case of 13-year-olds. Examples of items that only the younger group mentioned and whose frequency of occurrence was 3 or more (a total of 116 such items were found): 10: *gömbölyű* 'round', 7: *boszorkány* 'witch', *komoly* 'serious', *muskátli* 'geranium', *zsaru* 'cop', 6: *jószívű* 'warm-hearted', *csóró* 'poor', *jeles* 'very good', *sündisznó* 'hedgehog' (etc.), 5: *anakonda* 'anaconda', *csukló* 'wrist', *krampusz* 'bogey-man', *utcalány* 'street-walker' (etc.), 4: *asztalos* 'joiner', *csacsi* 'donkey', *emésztő* 'cesspool', *harmonika* 'accordion', *hőmérséklet* 'temperature', *adás* 'broadcast', *páva* 'peacock' (etc.), and 3: *bojt* 'tassel', *csipke* 'lace', *csorda* 'herd', *előhang* 'prologue', *féreg* 'worm', *nyomorék* 'disabled', *pelyhes* 'downy', *szalonna* 'bacon', *zsalu* 'shutters', *tejszínhab* 'whipped cream' (etc.). The material contained a few obscene words, too. It is interesting that a few 'neologisms' were also found that illustrate the changes of the words stock, e.g., *csúcsragadozó* 'top predator' that as many as three pupils included in their lists.

The number of lexemes occurring only with the 13-year-olds (and occurring three or more times) was 189, significantly more than those mentioned by the younger ones only. Examples: 9: *deltoid* 'id.', *egészség* 'health', *internet* 'id.', 8: *fájdalom* 'pain', *takarít* 'clean', *völgy* 'valley', *kémcső* 'test-tube', 7: *higany* 'mercury', *sor* 'row', *szex* 'sex', 6: *hélium* 'helium', *pia* 'booze', *nyávog* 'mew', *óvszer* 'condom', *alvázszám* 'chassis number', 5: *készít* 'make', *tanító* 'teacher', *szenvedés* 'suffering', *őrült* 'mad', *puszi* 'kiss', *pszichopata* 'psychopath', *himnusz* 'anthem' (etc.), 4: *nemi szerv* 'genital organ', *óda* 'ode', *paróka* 'wig', *hangkártya* 'sound card', *koporsó* 'coffin', *jövő* 'future', *veszekszik* 'quarrel', *utálat* 'disgust', *vallás* 'religion' (etc.), and 3: *fogamzásgátló* 'contraceptive', *féltékenység* 'jealousy', *bimbó* 'bud', *költészet* 'poetry', *horgászik* 'angle', *kocog* 'jog', *rendszám* 'registration number', *intelligens* 'intelligent' (etc.). The numbers and the examples conceal the possibility of a semantic analysis that may involve a number of psychological conclusions as well. Since the aims of the present paper do not include such an analysis, let us rest content with making a few points here. The most frequent associations of 13-year-olds contained names of animals in only 1.05% of the cases, whereas the same ratio with 12-year-olds is still 14.65%. On the other hand, words having to do with sexuality and negative emotions exhibit a sharp rise between the two groups. With 12-year-olds, these two sets of words constitute 2.58% each, whereas a year later they go up to 4.23% and 18.9%, respectively. Frequent words in the field of hobbies show a shift, too. With 12-year-olds, fairy tales dominate (*boszorkány* 'witch', animals, *krampusz* 'bogey-man'). The effect of television also shows up in their associations (*szappanopera* 'soap opera', *bemondó* 'announcer'). 13-year-olds mention leisure activities characteristic of older age groups, although *tévé* 'television' occurs frequently, too (*táncol* 'dance', *internet*, as well as other computer terms). Although using a different lexeme, both groups mention *pecázás* 'dangling a line' (12-year-olds) or *horgászás* 'line-fishing' (13-year-olds). The effect of school subjects can be seen in both groups, with a characteristic difference of activated words; items like *barnakőszén* 'brown coal', *hőmérséklet* 'temperature', *nagyító* 'magnifier', *paraszt* 'peasant', *világegyetem* 'universe', or *viasz* 'wax' (sixth-formers) contrast, as it were, with the associations of the seventh-formers like *elektron* 'electron', *deltoid* 'id.', *kémcső* 'test-tube', *higany* 'mercury', *tápanyag* 'nutriment', *autotróf* 'autotrophic', *magnézium* 'magnesium', *stroboszkóp* 'stroboscope', or *vegyjel* 'chemical symbol'.

Average values, as well as minimal and maximal numbers of activated words, are summarised in Figure 1 (overleaf). The scatter values are 41.94 (girls) and 36.6 (boys) for 12-year-olds and 39.5 (girls) and 39.06 (boys) for 13-year-olds. Individual differences, as was to be expected, are rather large. Girls activated more words than boys did, although in minimal and maximal amounts the differences are slight. This means that in both age groups more girls activated significantly more words. The difference between younger and older girls is larger than that between younger and older boys; boys exhibit stagnation across age groups or even declining performance (in terms of the minimum values). With girls, the minimum value grows twice as large in a year.

The total number of activated mental words, for the 12-year-old girls, was 13,877, whereas for the 13-year-old girls it was 14,685. That is, figuratively speaking, girls activated some eight hundred words more 'a year later', hence their 'word acquisition rate' was 2.21 words a day. The number of words activated by the 12-year-old boys was 11,874, that of 13-year-old boys was 11,751. The difference is a mere 123 words (approximately 1%), but with the younger group having the larger number, that is, having activated that many more words in the allotted time. We can conclude that the boys of the two age groups did not show any difference in the process of lexical access.

The above questions become especially important if we ask them for boys and girls separately. The apparent stagnation of boys' mental lexica may correspond to their writing skills (boys usually write more slowly and less neatly than girls do), but it may also be independent of them. In either case, there is an obvious disadvantage compared to girls, one that affects boys'

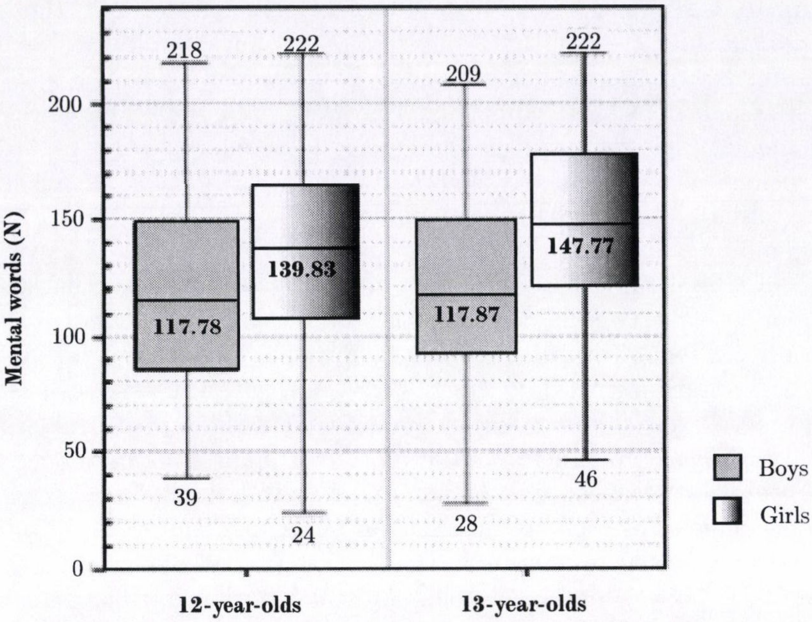


*Fig. 1*
Results of the word association test by age and gender

learning processes, their results in testing, and altogether adversely affects their appreciation at school.

With respect to the limiting values, an important question arises. Did children who activated extremely few words write frequent or infrequent words (compared to the full corpus)? Our hypothesis with respect to this question was that children accessing few words would necessarily activate words that are the most frequent for the given age group. The data confirmed our assumption. We picked the ten sixth-formers and the ten seventh-formers who wrote the fewest words. Table 1 shows how the words they wrote—a total of 858 lexemes—were distributed in terms of frequency ranges. We made five word groups on the basis of how many pupils activated the same lexeme. The figures demonstrate that the occurrence of identical items is very high with those who activated few words, that is, individual differences are the smallest in their case.

A statistical analysis of the whole corpus also revealed a negative correlation between performance per pupil and the frequency index of the activated lexemes. It can be stated that the more words a pupil activated the higher number of his/her words fell in the $3 \leq n \leq 39$ range.

*Table 1*

Frequency of words with children who wrote few words

| FREQUENCY | RATIO OF LEXEMES WITH POOR PERFORMERS (%) n = 858 → 100% | RATIO OF LEXEMES IN THE FULL CORPUS (%) n = 7397 → 100% |
|---|---|---|
| $n<3$ | 8.28 | 8.93 |
| $3\leq n\leq 19$ | 23.19 | 28.06 |
| $20\leq n\leq 39$ | 13.52 | 16.76 |
| $40\leq n\leq 79$ | 17.02 | 18.16 |
| $n\leq 80$ | 38.00 | 28.10 |

### 3.1.1. A "typology" of word associations

Word associations are a peculiar kind of lexical access (both in terms of the process and of its results) that come into being as a result of phonological, semantic, or structural relationships or their combinations. The system we established on the basis of the relevant literature and our own material is the following.

1. Phonological relationships
   (a) homonymy
   (b) partial phonological identity
2. Structural relationships
   (a) suffixation
   (b) compounding
   (c) phrases
3. Semantic relationships
   (a) coordination
   (b) subordination/superordination
   (c) part-of-speech identity

**3.1.1.1. Phonological identity** may concern the full word form (this is the case of homonymy), or part of it (its initial or final segment, sequence, or syllable). In our material, the following subtypes of phonological similarity can be distinguished.

(a) Adjacent words begin with the same CV sequence (plus may or may not exhibit a coordinative semantic relationship), e.g. *baba* 'doll' – *baka* 'infantryman', *család* 'family' – *csalán* 'nettle', *fotel* 'armchair' – *fogas* 'coat-stand', *fuvola* 'flute' – *furulya* 'recorder'. The effect of a semantic relationship can be modified by phonological similarity (this is what Jakobson exemplifies by the preference of *horrible Harry* over *terrible Harry*, cf. Jakobson 1969, 222). Examples where a monosyllabic word triggers a similar-sounding longer item in which even the original syllable structure may be eliminated also belong here: *csat* 'buckle' – *csattog* 'clatter', *hód* 'beaver' – *hódol* 'pay homage', *öt* 'five' – *ötlet* 'idea', *pad* 'bench' – *padló* 'floor', or the same relationship working 'in reverse': *sörét* 'small shot' – *sör* 'beer'.

(b) Adjacent words end in the same VC/CV sequence or share more material at the end (again, with or without a semantic relationship), e.g., *fotel* 'armchair' – *hotel* 'id.', *blöki* 'pooch' – *löki* 'he pushes it', *gatya* 'pants' – *kutya* 'dog', *vipera* 'adder' – *opera* 'id.', *terület* 'area' – *kerület* 'district'. In most cases, the pairs consist of an identical number of syllables, exceptions: *szemöldök* 'eyebrow' – *köldök* 'navel', *ajtókilincs* 'door-handle' – *bilincs* 'handcuffs', *leopárd* 'leopard' – *gepárd* 'cheetah', *billentyű* 'key' – *kesztyű* 'glove', *moly* 'moth' – *zsámoly* 'hassock'.

**3.1.1.2.** In **structural relationships**, again, additional semantic strategies may also be at work. The data that we classified as belonging here are the ones in which we think structure was the dominant basis of association. Collocation is a relatively frequent strategy whereby words that usually occur in sequence in normal speech trigger each other's appearance in the list (in Hungarian, these are usually attributive phrases or compounds). For instance: *ravasz róka* 'sly fox', *örök szerelem* 'eternal love', respectively *pók* 'spider' – *pókháló* 'cobweb'.

(a) The association strategy based on suffixation may take four different forms. (i) Stem followed by derived word: *fagy* 'frost' – *fagyi* 'ice cream', *harc* 'fight' – *harcos* 'fighter'. (ii) Derived word followed by its stem: *hatványozás* 'raising to a higher power' – *hatvány* 'power (of a number)', *ruházat* 'clothing' – *ruha* 'clothes'. (iii) Association based on shared stem: *borító* 'cover' – *boríték* 'envelope', *ellenőrző* 'report book' – *ellenőrzés* 'supervision'. (iv) Association based on shared suffix: *szervetlen* 'inorganic' – *ehetetlen* 'inedible' – *verhetetlen* 'unbeatable', *lábatlan* 'footless' – *álmatlan* 'sleepless' – *vágyatlan* 'undesired'.

(b) With respect to compounds, several subtypes are found: (i) Simple → compound, the basis of association becomes the anterior member: *barát* 'friend' – *barátnő* 'girlfriend', *cipő* 'shoe' – *cipőfűző* 'shoelace'. (ii) Simple → compound, the basis of association becomes the posterior member: *csuka* 'pike'

– *focicsuka* 'soccer shoes', *szivacs* 'sponge' – *tengeri szivacs* 'sea sponge', *szülők* 'parents' – *nagyszülők* 'grandparents'. (iii) Compound → simple, the anterior member is retained: *asztalláb* 'table leg' – *asztal* 'table', *pénztárca* 'wallet' – *pénz* 'money'. (iv) Compound → simple, the posterior member is retained: *állatkert* 'zoo' – *kert* 'garden', *rövidnadrág* 'shorts' – *nadrág* 'trousers'. (v) Both words are compound, sharing their anterior member: *Csipkerózsika* 'Sleeping Beauty' – *csipkebogyó* 'rose-hips', *fogkefe* 'tooth-brush' – *fogkrém* 'toothpaste'; verbs sharing the same preverb are listed also in this category: *megáll* 'stop' – *meglátogat* 'visit' – *megcsal* 'cheat on' – *meghív* 'invite'. (vi) Both words are compound, sharing their posterior member: *dióbél* 'walnut kernel' – *vakbél* 'caecum', *sípcsont* 'shin-bone' – *lapos csont* 'flat bone' – *kulcscsont* 'collar-bone' – *lábszárcsont* 'shank-bone'.

(c) Phrases are closely related to compounds, they are usually attributive or adverbial phrases (occasionally the children divide them by commas in their lists): *szőke nő* 'blond woman', *nemi szerv* 'genital organ', *illatos kölni* 'scented perfume'. Predicative phrases and consequence relationships also occur: *tanár* 'teacher' – *szid* 'scold', *csoki* 'chocolate' – *olvad* 'melt', *harap* 'bite' – *vicsorít* 'snarl' – *kutya* 'dog' – *macska* 'cat', *gólya* 'stork' – *csecsemő* 'baby'. Their connection with compounds is further shown by associative pairs that are members of an existing compound: *harisnya* 'stockings' – *cipő* 'shoe' – *kanál* 'spoon' (cf. *cipőkanál* 'shoe-horn') – *jég* 'ice' – *korong* 'disk' – *foci* 'soccer' (cf. *jégkorong* 'ice hockey'), *fizika* 'physics' – *óra* 'hour' – *rend* 'order' – *őr* 'guard' – *irodalom* 'literature' (cf. *fizikaóra* 'physics class', *órarend* 'timetable', *rendőr* 'policeman').

Taking the number of phonological and structural associations together (1461, or 2.8% of the whole corpus) to be 100%, their relative proportions are 38% vs. 62%, that is, structural relationships are more frequent. In the case of phonological associations, shared word beginnings are a lot more frequent, 31% out of the total 38%. Among structural associations, compounds are more frequent than derivations, the latter making up 5% of the cases, whereas the former make up 57%. Among compounds, the *cipő* 'shoe' – *cipőfűző* 'shoelace' type is the most frequent, and the *állatkert* 'zoo' – *kert* 'garden' type is the least frequent. Phonological associations occurred with 68.75% of the children (two items on average, with one child who wrote 17). Morphological associations occurred with 75.5% of the children (2.5 items on average).

**3.1.1.3.** Among **semantic relationships**, the most general type in free word association is usually taken to be coordination (Aitchison 1987, 74); the point here is that the associatum represents the same level of generality as the trigger, e.g., *só* 'salt' and *bors* 'pepper' or *nap* 'sun' and *hold* 'moon'. Opposites like *fekete* 'black' and *fehér* 'white' or *nappal* 'day' and *éjszaka* 'night' also belong here. Subordination is also attested; this is where the associatum is in a genus/species relationship with what precedes it, e.g., *madár* 'bird' – *gólya* 'stork' or *szín* 'colour' – *zöld* 'green'. A similar relationship "in the opposite direction" can be called superordination, e.g., *puska* 'rifle' – *fegyver* 'weapon'. The occurrence of synonyms is rather infrequent, e.g., *kövér* 'fat' – *hájas* 'obese', *kerékpár* 'bicycle' – *bicó* 'bike', *mikulás* – *télapó* (both: 'Santa Claus'), *rohan* 'rush' – *szalad* 'run', *együttes* 'band' – *zenekar* 'orchestra'.

(a) Coordination will be defined as a relationship between items in a semantic field that are of the same level of generality. Metonymical and situation-based associations are also classified as belonging here. Examples: *blúz* 'blouse' – *nadrág* 'trousers' – *cipő* 'shoes' – *zokni* 'socks', *tojás* 'egg' – *embrió* 'embryo'; spatial contiguity: *kémény* 'chimney' – *füst* 'smoke', *szánkó* 'sledge' – *hó* 'snow', *pattanás* 'pimple' – *arc* 'face', *cseresznye* 'cherry' – *kukac* 'maggot'. A specific subcase of spatial contiguity based on the test situation is the one in which the children list objects they can see in the classroom: *pad* 'school-bench' – *szék* 'chair' – *asztal* 'desk' – *konnektor* 'wall socket' – *könyv* 'book' – *füzet* 'exercise-book'. Part–whole relationship: *háló* 'net' – *kapu* 'goal', *monitor* 'id.' – *számítógép* 'computer', *autó* 'car' – *rendszám* 'registration number'; 'made of' or causal relationship: *bor* 'wine' – *szőlő* 'grapes', *álmosság* 'sleepiness' – *elalvás* 'falling asleep', *csúszik* 'be slippery' – *jeges* 'icy'. Opposite or complementary pairs: *hülye* 'stupid' – *okos* 'clever', *tűz* 'fire' – *víz* 'water', *haver* 'chum' – *ellenség* 'enemy', *gyerek* 'child' – *felnőtt* 'adult', *anya* 'mother' – *apa* 'father'.

(b) Examples of sub/superordinate terms: *rovar* 'insect' – *légy* 'fly', *zöldség* 'vegetable' – *répa* 'carrot', *szervek* 'organs' – *szív* 'heart', *hajó* 'ship' – *Titanic*, *bolygó* 'planet' – *Merkúr* 'Mercury'; respectively *puska* 'rifle' – *fegyver* 'weapon', *galóca* 'amanita' – *gomba* 'mushroom', *zokni* 'socks' – *fehérnemű* 'underwear'.

A separate category could be called "other associative relationships". This includes cases that do not, strictly speaking, fit into any of the above categories but are motivated. For instance, a list of plants may include kinds of fruit: *fa* 'tree' – *nárcisz* 'narcissus' – *narancs* 'orange'; or a list of colours may shift into a list of fruit when 'orange' comes up: *barna* 'brown' – *lila* 'violet' – *narancs* 'orange' – *citrom* 'lemon'.

(c) The category of lists based on part-of-speech identity includes series of adjectives or verbs. No obvious conceptual relationship can be found within each pair of items: (*puska* 'rifle' –) *lő* 'shoot' – *beszél* 'speak' – *gondolkozik* 'ponder', *ül* 'sit' – *áll* 'stand' – *mosogat* 'wash up' – *tévézik* 'watch television', (*busz* 'bus' –) *utazni* 'to travel' – *sétálni* 'to walk' – *fagyizni* 'to have an ice cream' – *nyal* 'lick' – *nézni* 'to watch' – *bámulni* 'to stare' – *olvasni* 'to read'; respectively *szép* 'nice' – *jó* 'good' – *okos* 'clever' – *ügyes* 'skilful' – *olasz* 'Italian', *hibbant* 'slightly cracked' – *mulya* 'doltish' – *ifjú* 'young' – *leleményes* 'inventive'.

A specific feature of associative access is that associative pairs/series of diverse types may be embedded into one another, resulting in a decrease of immediate relationships. For instance (glosses: mix, beat, give, blood, get, red, cross, violet, blue):

kever ⇨ ver → ad ➜ vér kap vörös ⇔ kereszt lila ➤ kék

We have selected the twenty top-scoring children (i.e., five boys and five girls in both age groups who wrote the largest number of mental words) and looked at their numerical data of the various types of association. The twenty children wrote a total of 4168 mental words. Taking 4168 to be 100%, we could establish that in 41.5% of the cases there was no relationship belonging to any of the above categories between adjacent words. The phonological and structural relationships (that were analysed with respect to the full corpus above) made up 1.3% and 2.3% of this sample. In the case of phonological relationships, we only counted cases of pure similar sounding; if that was coupled with some kind of conceptual relationship, we counted the case at hand as an instance of the latter. The category that turned out to be the most populous was coordination (32.5%), followed by subordination (0.7%) and superordination (0.4%). Phrases were a full 1%. Within that sample of 4168 mental words, 58.5% of adjacent words showed some observable pairwise relationship. Taking the latter set to be 100%, the following proportions were found for the individual types. Coordination: 59.3%, opposites: 5.2%, sub- or superordination: 1.9%, synonyms: 3.5%, other associative links: 7%, situational relationships 10.8% (of these, some 2.8% were made up by objects seen in the classroom), all these add up to 88.5%. Part-of-speech identity: 6.6%, compounds: 1.9%, attributive and adverbial relationships: 2.1%, predicative relationship: 0.7%, other: 0.3%.

The associative lists also included **repetitions**, whose occurrence was subject-dependent. The total number of these was 695 (cases where the same child wrote the same word twice, occasionally three times). Compared to the total number of activated words, this is negligible, a mere 1.3%. What is more interesting is the number of children who repeated words at all. 271 children, 67.25% of the subjects repeated at least one word, with no statistical difference between girls and boys or sixth-formers and seventh-formers. The question arises of whether the number of repetitions correlates with total performance. According to our calculations, it does: the more words one child wrote the more chance there was for a few repetitions to crop in. Hence, the repeated occurrence of the same lexical item was not a sign of accessing failures but rather a side effect of good performance. Repetitions mainly concerned objects in the classroom or school concepts. The lexemes repeated the most often (with the number of repetitions in parentheses) were *óra* 'hour/watch/clock/school class' (21), *tábla* 'blackboard' (12), *kép* 'picture', *könyv* 'book', *virág* 'flower' (11), *cipő* 'shoes' (10), *fa* 'tree', *toll* 'pen' (9), *ceruza* 'pencil', *kabát* 'coat', *radír* 'eraser', *víz* 'water' (8), *szék* 'chair', *üveg* 'glass' (7), and *haj* 'hair', *pad* 'bench' (6). It appears that whenever the children got into a dead end in the course of free associations, it was the objects of their immediate physical environment that served as clues to help the series of associations move on.

Several characteristics of repetitions can be observed that may refer to the explanation (or cause) of their occurrence. The same word form may appear in different meanings within different association environments (this amounts to a 5–6% of cases). For instance: *hold* 'moon', ***nap*** 'sun', *fény* 'light'; *hónap* 'month', ***nap*** 'day', *év* 'year'; or *kenyér* 'bread', ***kosár*** 'basket', *túrórudi* 'curd dessert'; *foci* 'soccer', ***kosár*** 'basket(ball)', *jégkorong* 'ice hockey'; or *festmény* 'painting', ***rajz*** 'drawing', *vetítő* 'projector'; *ének* 'singing (lesson)', ***rajz*** 'drawing (lesson)', *biológia* 'biology'; or *tanterem* 'classroom', ***óra*** 'lesson', *osztály* 'class'; *perc* 'minute', ***óra*** 'hour', *kevés* 'too few'; *gyönyörű* 'beautiful', ***óra*** '(wrist)watch', *karkötő* 'bracelet'; or *szív* 'heart', ***lép*** 'lien', *máj* 'liver'; *lépés* 'step' (noun), ***lép*** 'step' (verb), *megy* 'go'; or *vasárnap* 'Sunday', ***egy*** 'one', *kettő* 'two'; *tető* 'roof', ***egy*** 'an', *öregember* 'old man'; or *irodalom* 'literature', ***föld*** 'ground', *rajzfilm* 'cartoon' (cf. *földrajz* 'geography'); *Mars* 'id.', ***Föld*** 'Earth', *Jupiter* 'id.'. Homonyms sometimes occur right in a row: *út* 'road', ***daru*** 'crane', ***daru*** 'derrick', *lyuk* 'hole'; *egér* 'mouse', ***nyúl*** 'rabbit', ***nyúl*** 'reach for', *róka* 'fox'; *menekül* 'flee', ***ég*** 'burn', ***ég*** 'sky', *bevásárlóközpont* 'shopping mall'. First names are also often repeated as if each classmate with the same name appeared separately in the lists. Another factor that might contribute to repetitions is the effect of associative relationships of diverse types. For instance, synonymy and coordination: *eb* 'dog', ***kutya*** 'dog', *szőnyeg* 'rug' + *ló* 'horse', ***kutya*** 'dog', *tábla* 'blackboard'; coordination and antonymy: *egér* 'mouse', ***fekete*** 'black', *párduc* 'panther' + *fehér* 'white', ***fekete*** 'black', *gyors* 'fast'; phrase and coordination: *szép* 'nice', ***kék*** 'blue', *virág* 'flower' + *barna* 'brown', ***kék*** 'blue', *piros* 'red'. Uncategorizable, probably individually explainable repetitions include *élet* 'life', ***halál*** 'death', *fent* 'high up' + *karambol* 'collision', ***halál*** 'death', *szenvedés* 'suffering'; *műt* 'operate on', ***halál*** 'death', *temet* 'bury' + *pap* 'priest', ***halál*** 'death', *fáj* 'it hurts'; *irodalom* 'literature', ***felmérés*** 'written exam', *lesés* 'peeping' + *felelés* 'oral exam', ***felmérés*** 'written exam', *folyók* 'rivers'; *szeretet* 'love', ***szív*** 'heart', *halál* 'death' + *boldogság* 'happiness', ***szív*** 'heart', *vers* 'poem'; *haj* 'hair', ***mell*** 'chest', *műszer* 'instrument' + *pénisz* 'penis', ***mell*** 'bust', *hegy* 'tip'. Often no explanation can be found for repetition; in such cases it is difficult to tell if the child was aware of the fact that (s)he was repeating a word. Examples: *füzet* 'exercise-book', ***ceruza*** 'pencil', *tolltartó* 'pencilbox' + *radír* 'eraser', ***ceruza*** 'pencil', *ellenőrző* 'report book'; *kulcs* 'key', ***táska*** 'bag', *papír* 'paper' + *filc* 'felt(-tip pen)', ***táska*** 'bag', *könyv* 'book'; *pulóver* 'sweater', ***nadrág*** 'trousers', *póló* 'jersey' + *dolgozat* 'test', ***nadrág*** 'trousers', *cipő* 'shoes', etc.

### 3.1.2. Part-of-speech categories

The corpus contains data from practically all part-of-speech categories, although the various word classes are of course represented very unequally. It is interesting to note, first, that it includes 41 English words, e.g., *episode*, *thriller*, *enter*, *transport*, *skate*, *city*, *alien*, *market*, *yellow*. These will be excluded in what follows, even though some of them may be in the process of domestication (*thriller* has perhaps become a loanword in Standard Hungarian). Part-of-speech distribution will be analysed in terms of **mental words** (total: 52,184), then in terms of **lexemes** (total: 7397, including proper names).

In investigating the association strategies of the children, we took non-finite verb forms to be suffixed forms (even though they appear to be regarded by children as simple, morphologically unanalysable forms). The various types of non-finite verb forms (abbreviated as *nf* in figures and tables below) occurred in the following numbers: 167 infinitives, 13 "adjectival" participles ('one that X-es/is X-ing', e.g., *ugráló* 'jumping', *szelő* 'cutting', *vágyakozó* 'wishing', *focizó* 'playing football', *lehulló* 'falling', *húzó* 'pulling', *visszahúzódzkodó* 'withdrawing', *faxoló* 'sending a fax'), 7 "adverbial" participles ('in an X-ing manner, while X-ing, having X-ed', e.g., *körülírva* 'paraphrasing', *rajzolva* 'drawing', *megbántva* 'hurting', *futva* 'running'). Most words that could be adjectival participles as well are included in the categories 'adjective' or 'adjective/noun' (e.g., *lökött* 'loony' (lit. 'pushed'), *üdítő* 'soft drink' (lit. 'refreshing'), *fényképező* 'camera', *fűző* 'corset'/'shoelace' (lit. 'lacing'), *erősítő* 'amplifier' (lit. 'strengthening'), *lopakodó* 'stealth bomber' (lit. 'one who walks stealthily'). The item *ugráló* 'jumping' could mean 'skipping-rope', and *bukó* 'falling/diving' could mean 'a pupil about to fail a school subject', it is difficult to tell out of context. Part-of-speech labels that are asterisked stand for ambiguous items (noun* = noun/adverb, e.g., *éjszaka* 'night/at night', *föl* 'skimmings/up', *hétköznap* 'weekday/on weekdays', *korán* 'Koran/early', *reggel* 'morning/in the morning', *vasárnap* 'Sunday/on a Sunday', *otthon* 'home/at home', *haza* 'motherland/(go etc.) home'; adv* = adverb/conjunction, e.g., *így* 'in this way/hence' or adverb/postposition, e.g., *alá* '(to) below', *mögé* '(to) behind', *mellé* '(to) beside', *kívül* 'outside/in addition to', or adverb/pronoun e.g., *arra* 'in that direction/onto that', *ki* 'out/who'; num* = numeral, including *hat* 'six/make an effect' and *hét* 'seven/week').

The category 'other' includes postpositions, articles, conjunctions, interjections (e.g., *hoppá* 'oops', *nyekk* 'sound of beeing floored', *kuss* 'shut up!'), and modifiers, as well as a few items whose categorisation is debatable (e.g., *szia* 'hi', *mizújs* 'what's up', *kösz* 'thanks', *anno* 'a long time ago'). The part-of-speech distribution of mental words and lexemes in the full corpus is shown in Figures 2 and 3, respectively.

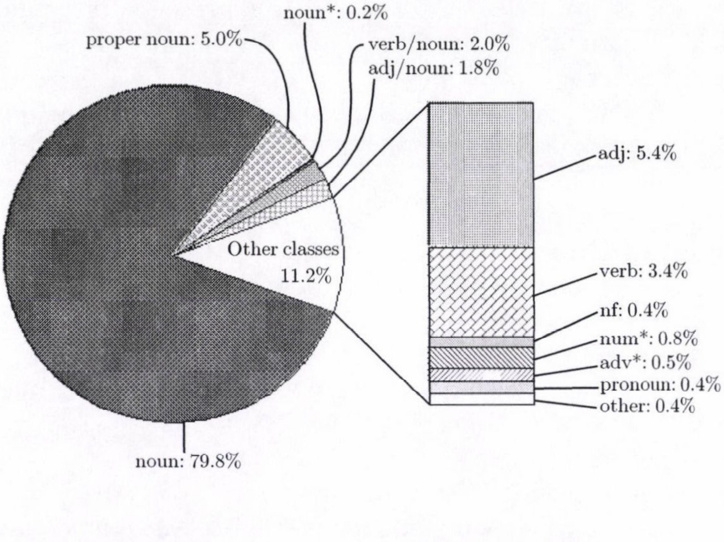


*Fig. 2*
The part-of-speech distribution of mental words in percentage

We have also analysed age and gender differences in mental words and in lexemes (Table 2).

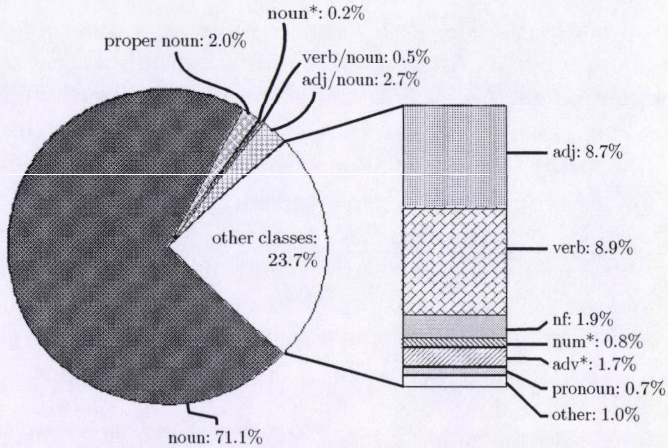


*Fig. 3*
The part-of-speech distribution of lexemes in percentage

*Table 2*
Part-of-speech distribution of mental words and lexemes in terms of age groups and genders

| | 12-YEAR-OLDS | | 13-YEAR-OLDS | | BOYS | | GIRLS | |
|---|---|---|---|---|---|---|---|---|
| | Mental words | Lexemes | Mental words | Lexemes | Mental words | Lexemes | Mental words | Lexemes |
| noun | 80.3% | 74.6% | 79.2% | 72.4% | 78.8% | 73.4% | 80.6% | 72.5% |
| proper noun | 5.3% | 1.5% | 4.8% | 1.4% | 6.2% | 1.8% | 4.0% | 1.1% |
| noun* | 0.2% | 0.2% | 0.3% | 0.2% | 0.2% | 0.2% | 0.3% | 0.3% |
| verb/noun | 2.0% | 0.6% | 2.0% | 0.6% | 2.1% | 0.6% | 2.0% | 0.6% |
| adj/noun | 1.6% | 2.8% | 1.9% | 2.6% | 1.9% | 3.0% | 1.7% | 2.5% |
| adj | 5.4% | 8.1% | 5.3% | 7.7% | 5.0% | 8.3% | 5.7% | 7.6% |
| verb | 2.9% | 7.4% | 3.8% | 8.9% | 3.0% | 6.9% | 3.7% | 9.6% |
| nf | 0.1% | 0.5% | 0.6% | 2.0% | 0.4% | 1.6% | 0.4% | 1.6% |
| num* | 1.0% | 1.1% | 0.5% | 0.6% | 1.0% | 0.8% | 0.6% | 0.9% |
| adv* | 0.4% | 1.5% | 0.6% | 1.7% | 0.5% | 0.8% | 0.4% | 0.8% |
| pronoun | 0.3% | 0.7% | 0.6% | 0.8% | 0.6% | 1.5% | 0.4% | 1.7% |
| other | 0.4% | 0.9% | 0.4% | 0.9% | 0.5% | 1.0% | 0.3% | 0.8% |

The proportions of lexemes are similar to those of mental words. The largest differences are with common nouns and proper nouns (relatively fewer lexemes) and with verbs (relatively more lexemes). This is in accordance with the fact that nouns are the most frequent words in the lists. Proper nouns constitute 5% of all mental words (6.18% of all nouns, common nouns and proper nouns added up). Most proper nouns are first names, probably those of concrete persons (e.g., classmates), but full personal names also occur. The occurrence of geographical names and titles was as expected, the latter mainly include titles of television programmes, films, less frequently those of literary pieces. Brand names occurred in surprisingly large numbers, a total of 121 with 12-year-olds and a total of 176 with 13-year-olds. Boys activated more than twice as many brand names as girls did, the difference is significant in both age groups. Boys wrote 3.55, whereas girls merely wrote 1.7 such words on average. The most populous groups of brand names were car models and/or Formula 1 stables, e.g., *Fiat*, *Ferrari*, *Porsche* (37.8% of all occurring brand names), soft drinks and other consumables, e.g., *Pepsi*, *Fanta*, *Milka* (15.5%), sports equipment producers, e.g., *Adidas*, *Nike*, *Fila* (15.2%). The word *rotring* was the single most frequent brand name, suggesting that it is becoming a common noun. The relatively frequent occurrence of brand names witnesses their common use, but it is also a sign of a change of the vocabulary, indicating the emergence of new lexemes.

260 of the four hundred subjects wrote one or more verbs, each of them wrote 7.28 verbs on average. There were 95 children who wrote a single verb each. Seventh-formers wrote significantly more verbs than sixth-formers, and girls wrote significantly more than boys did. It can be assumed that for the younger age group *word* ('onoma') equals *name*, meaning primarily nouns, to a larger extent. Wherever a verb occurs, another one usually follows suit. Disregarding those who wrote a single verb in their whole lists, the average number of verbs that immediately follow the first verb is 1.45. The longest sequence of verbs (consisting of 16 items) was written by a 12-year-old girl: (*tallér* 'thaler'), *dolgozik* 'work', *tévézik* 'watch television', *alszik* 'sleep', *eszik* 'eat', *iszik* 'drink', *dohányzik* 'smoke', *rágózik* 'chew gum', *ír* 'write', *rajzol* 'draw', *fest* 'pain', *másol* 'copy', *olvas* 'read', *néz* 'watch', *kér* 'ask for', *kap* 'get', *örül* 'be glad', (*krém* 'cream') – in this case, we arbitrarily took *ír* 'write/Irish(man)' to be a verb.

The number of lexemes classifiable both as nouns and as verbs was 35 (=1133 mental words). Listed in an order of decreasing frequency, they were the following: *fej* 'head/milk (e.g., a cow)', *fal* 'wall/devour', *ing* 'shirt/wobble', *nyúl* 'rabbit/reach for', *fog* 'tooth/hold', *csap* 'tap/strike', *ír* 'Irish(man)/write', *szív* 'heart/inhale', *tűz* 'fire/(fasten with a) pin', *csavar* 'screw/twist', *ég* 'sky/burn', *nő* 'woman/grow', *dob* 'drum/throw', *terem* 'hall/yield', *áll* 'chin/stand', *zár* 'lock/shut', *vár* 'castle/wait', *sír* 'grave/cry', *ér* 'blood vessel/be worth', *szeg* 'nail/hem', *volt* 'volt/was', *fél* 'half/be afraid', *él* 'edge/live', *lép* 'lien/step', *fagy* 'frost/freeze', *nyom* 'trace/push', *sejt* 'cell/guess', *nyű* 'maggot/wear down', *les* 'offside/peep', *szán* 'sleigh/pity', *követ* 'envoy/follow', *zavar* 'confusion/disturb', *szignál* 'signature tune/sign', *tett* 'deed/did', *varrat* 'seam/have a dress made'. The fundamental question in this respect is whether it is the nominal or the verbal meaning that is activated; also, whether something suggests that both meanings may be activated for a single form (about multiple activation of ambiguous lexical items in perception cf. Pléh 2000). An associative link may be present with the previous word, the following word, or both, or indeed neither. There were cases in which a mental word of the type verb/noun (or verb/noun/adjective for *volt* 'was/volt/former' and *ír* 'write/Irishman/Irish') was found in a sequence where there was a link with the previous word but a sudden semantic shift occurred between the word at hand and the following one: *sétál* 'walk', *ül* 'sit', ***áll*** '**stand**/chin', *csend* 'silence'; *nap* 'sun', *felhő* 'cloud', ***ég*** '**sky**/burn', *emelet* 'storey'; *kabát* 'coat', *dzseki* 'jacket', ***ing*** '**shirt**/wobble', *ágy* 'bed'-this was the case in 27.7% of such sequences. With the following word, there was a clear connection in 25.9% of the cases: *ügyes* 'skilful', *ügyetlen* 'clumsy', ***áll*** 'chin/**stand**', *ül* 'sit'; *alma* 'apple', *kivi* 'kiwi', ***szív*** 'inhale/**heart**', *bél* 'bowels'. In 26.7% of the instances, connections were observable both ways: *könyök* 'elbow', *csukló* 'wrist', ***áll*** '**chin**/stand', *száj* 'mouth'; *gatya* 'pants', *ruha* 'dress', ***ing*** '**shirt**/wobble', *cipő* 'shoes'. A preceding activation can influence the subject's choice at a later point, too. For instance, the sequence *levegő* 'air', *víz* 'water', ***csap*** '**tap**/strike', *föld* 'earth' may be based on the collocation *víz, csap* 'water, tap' interrupting the coordinative series 'air, water, earth', i.e., the 'elements' of ancient and medieval natural history.

In some cases, words of several more or less contiguous conceptual fields are accessed almost alternately, e.g., *mosdószivacs* 'toilet-sponge', *szappan* 'soap', ***fürdőkád*** 'bathtub', *zokni* 'socks', *sampon* 'shampoo', *papucs* 'slippers', ***csap*** 'tap', *ruházat* 'clothing', *törülköző* 'towel'; ***zokni*** 'socks', *zsiráf* 'giraffe', ***ing*** 'shirt', *nyuszi* 'bunny', ***papucs*** 'slippers'; *hangya* 'ant', *sün* 'hedgehog', ***beszél*** 'talk', ***ír*** 'write', *nyúl* 'rabbit', *ól* 'sty'. Coordinative relationships may be intertwined with collocation-based associations: *karóra* 'wristwatch', ***csavar*** 'screw', ***anya*** 'mother', *apa* 'father', ***anyacsavar*** 'screw nut', ***csavarhúzó*** 'screwdriver', *szerelés* 'installation'; ***tábla*** 'blackboard', *kocka* 'cube', ***fal*** 'wall', *dobókocka* 'dice'. It is impossible to tell what might cause a mental detour like *gólya* 'stork', *macska* 'cat', *kutya* 'dog', *táska* 'bag', *nyúl* 'rabbit', *zebra* 'id.', *kígyó* 'snake'.

Structural relationships with preceding/following items are less clear indicators of which meaning is probably present. In particular, they are incapable of excluding the irrelevant reading: *kalapács* 'hammer', ***fogó*** 'pliers/holder', ***fog*** 'hold?/tooth?', *iroda* 'office'; *lepedő* 'bed-sheet', ***háló*** 'bedroom', ***ing*** 'shirt?/wobble?', *magas* 'tall' (cf. *hálóing* 'night-dress'); ***szőke*** 'blond', ***nő*** 'woman?/grow?', *nemi szerv* 'genital organ'. Similarly, with primarily phonological relationships, it is uncertain which meaning is activated (both?) e.g., *körömlakk* 'nail varnish', ***fok*** 'degree', ***fog*** 'hold?/tooth?', *villanykörte* 'light-bulb'; *nyál* 'saliva', *nyelv* 'tongue', ***nyúl*** 'rabbit?/reach out?', *nyel* 'swallow'; *fekete* 'black', *szín* 'colour', *szív* 'heart?/inhale?', *kirándulás* 'excursion'. In the sequence *fű* 'grass', *virág* 'flower', *les* 'peep?/offside?', *foci* 'soccer', it is likely that *foci* is triggered by *les* as a noun, but this does not necessarily prove that it was only the nominal reading of *les* that was activated.

The frequency values of the above 35 ambiguous lexemes are diverse; *fej* 'head/milk', *fal* 'wall/devour', *ing* 'shirt/wobble', and *nyúl* 'rabbit/reach for' are among the most frequently occurring items, belonging to the '80 or more' range, whereas *szignál* 'signature tune/sign', *tett* 'deed/did', *zavar* 'confusion/disturb', *követ* 'envoy/follow', and *varrat* 'seam/have a dress made' only occur once. We have made a calculation of the proportions of the various readings of ambiguous lexemes occurring at least twenty times. The category "impossible to tell" collects items whose environment does not disambiguate them. Examples: *táska* 'bag', *térkép* 'map', ***ing*** 'shirt/wobble', *ajtó* 'door'; *gólya* 'stork', *kökörcsin* 'meadow anemone', ***vár*** 'castle/wait', *Lengyelország* 'Poland'. This is where phonologically-based occurrences are also included. Table 3 furthermore contains frequency values taken from Füredi–Kelemen (1989). Vacant rubrics mean that the given part-of-speech reading did not occur in the material of that frequency dictionary at least ten times.

Comparing our data with those of the frequency dictionary, the items *csap*, *csavar*, *fog*, *nyúl*, *zár* appear to be interesting in that part-of-speech frequency shows the opposite tendency in the two sets of data. With the children, "importance" matters, and also whether objects can be directly seen around them. For some lexemes—*fej*, *fal*, *ír*—several factors seem to conspire to achieve the attested asymmetrical results. On the other hand, some items clearly support multiple activation, even though the given experimental setup does not make it possible for us to decide if these are cases of simultaneous or retrospective activation (cf. Pléh 2000, 968). This is because the given item is available for an unlimited amount of time in the case of a written task, therefore "multiple recognition" is possible.

*Table 3*

Frequency of occurrence of ambiguous words (*main verb, **auxiliary)

| LEXEME | NOMINAL MEANING (%) | | VERBAL MEANING (%) | | IMPOSSIBLE TO TELL (%) | FREQUENCY VALUES OF FÜREDI–KELEMEN (1989) | |
|---|---|---|---|---|---|---|---|
| | | | | | | NOUN | VERB |
| áll | chin | 13.79 | stand | 68.97 | 17.24 | 30.48 | 820.17 |
| csap | tap | 73.61 | strike | 2.78 | 23.61 | – | 45.68 |
| csavar | screw | 53.06 | twist | 2.04 | 44.90 | – | 11.83 |
| dob | drum | 32.50 | throw | 10.00 | 57.50 | – | 39.79 |
| ég | sky | 42.86 | burn | 30.61 | 26.53 | 101.3 | 64.88 |
| fal | wall | 70.64 | devour | 0.92 | 28.44 | 214.03 | — |
| fej | head | 80.18 | milk | 0.90 | 18.92 | 664.07 | — |
| fog | tooth | 61.64 | hold<br>will | 8.22 | 30.14 | 53.18 | 163.45*<br>341.41** |
| ing | shirt | 61.18 | wobble | 1.18 | 37.65 | 69.30 | – |
| ír | Irish | 1.41 | write | 95.77 | 2.82 | – | 164.82 |
| nő | woman | 90.70 | grow | 0.00 | 9.30 | 347.6 | 46.68 |
| nyúl | rabbit | 75.29 | reach | 2.35 | 22.35 | – | 65.34 |
| sír | grave | 19.05 | cry | 57.14 | 23.81 | 44.82 | 112.02 |
| szív | heart | 62.69 | inhale | 2.99 | 34.33 | 175.63 | 32.26 |
| terem | hall | 81.25 | yield | 0.00 | 18.75 | 63.97 | 21.78 |
| tűz | fire | 74.07 | pin | 0.00 | 25.93 | 70.28 | 20.45 |
| vár | castle | 14.81 | wait | 22.22 | 62.96 | 14.46 | 464.02 |
| zár | lock | 72.41 | shut | 0.00 | 27.59 | 13.9 | 31.55 |

One of the cardinal issues pertaining to the structure of the mental lexicon is **the way suffixes are encoded**. According to some hypotheses, the grammatical structure of a language determines the structure of its mental lexicon (Aitchison 1987). It is claimed that in agglutinating languages the relationship between stems and suffixes within the mental lexicon is different from that relationship in non-agglutinating languages. One possible consequence is that suffixed forms are easier to access in languages with rich morphologies. This can be accompanied by the occurrence of bare suffixes, in addition to root morphemes, during word activation. We had anticipated that we would find relatively numerous suffixed lexical items in our corpus. Although such forms did occur, their ratio of occurrence was small. The 12-year-olds listed 419, and the 13-year-olds listed 784 such forms. It is true that in absolute numbers these figures seem to be considerably large and the trend is increasing; however, suffixed forms constitute a mere 2.3% of the whole corpus of mental words. Hence, word activation gives preference to word stems (root morphemes), i.e., children access meanings or concepts, not forms that can be directly inserted into syntactic structures. The most frequent suffixed forms are plural nouns or adjectives, making up 51% of all suffixed forms; infinitives constitute 15.1%; and all the others occur in the remaining 32.46% of cases.

Inflected word forms occurring ten times or more in the corpus are the following: *állatok* 'animals' (21), *színek* 'colours' (17), *számok* 'numbers' (17), *emberek* 'people' (14), *szavak* 'words' (13), *betűk* 'letters' (11), *gyerekek* 'children' (11), *barátok* 'friends' (10), *írni* 'to write' (10), *csillagok* 'stars' (10), *fiúk* 'boys' (10). Words that are unambiguously nouns, are not plurals but some other inflected forms, and were written by at least two children are *megszentségteleníthetetlenségeskedéseitekért* 'for your (pl.) repeated pretending to be undeconsecrateable' (4), *egészségedre* 'cheers!' (3), *anyád* 'your mother' (an insult) (3), *megszentségteleníthetetlenségeskedéseiteket* 'your (pl.) repeated pretending (acc.) to be undeconsecrateable' (2), *tesóm* 'my brother/sister' (2). Other attempts at being "funny" include *megegészségesedésetekért* 'for your (pl.) becoming healty', *megvezekeléseitekért* 'for your (pl.) repeatedly being punished' and, among verbs, *elkelkáposztásítottalanították* 'they deprived it from having been turned into savoy cabbage'. The adj. and adj./noun groups also included plural forms like *rosszak* 'the bad ones' (3), *magyarok* 'Hungarians' (2), *élők* 'the living ones' (1); also, there sporadically occurred other inflected forms like *vörösben* 'in red', *jókkal* 'with the good ones'. Verbs occurred in objective conjugation, in the imperative, etc. (in addition to infinitives mentioned previously): *viszi* 'carries it' (8), *veszi* 'takes it' (7), *lesz* 'will be' (7), *vigyázz* 'take care!' (4), *csináld* 'do it!' (2), *nézd* 'look at it!' (2), *megyek* 'I go' (2), *utálom* 'I hate it' (2), *utállak* 'I hate you' (2), *hívnak* 'they call me' (2), *bejött* 'came in' (2), *gondoskodott* 'made sure' (2), *lógni fogsz* 'you will be hanged' (1). The only occurring conditional forms were *szeretne* 'would like to' (1), *lenne* 'would be' (1). Examples of other parts of speech occurring in an inflected form: *többet* 'more (acc.)' (1), *nyolcadika* 'the eighth (day of the month)' (1), *mit* 'what (acc.)' (5), *ezt* 'this (acc.)' (3), *ezzel* 'with this' (2). The frequency of activation of a suffixed form is not to be confused with its accessibility. Experiments involving reaction time confirmed that there is no difference, in terms of ease of lexical access, between suffixed vs. unsuffixed words (Gósy 1998b).

### 3.2. Comparing word activations 60 years apart

The question arises of how our own data relate to János Cser's material recorded more than six decades ago. The identical number of subjects participating in the two experiments makes direct comparisons possible. The total number of words activated by the "grandparents" of our present-day subjects was 37,912—i.e., they wrote 14,313 words fewer than those tested in 1999. This difference is extremely large, and the reason for it can again be twofold: first, the size of the vocabulary and/or the ease of access may differ, and second, the changing speed of handwriting may be held responsible. While six decades ago an average of 6.3 words were written in a minute, today 8.7 words were. The difference is 2.4 words per minute. This is relatively such a large number that it cannot be simply due to the different speed of handwriting. We had to conclude that—whether or not in an absolute sense—the vocabulary of today's 12/13-year-olds is probably larger than that of their (great)grandparents, and/or their accessing processes are faster. Another potential factor would be the possibly different strategies employed by the two groups of subjects. János Cser notes that his Hungarian subjects were slower than American and Swiss (probably French-speaking) children tested in similar word association experiments had been. He mentions the following factors as responsible for that difference: "the speed of association, the size of concept stock [vocabulary], the ability to express what they mean, the length of words, and the speed of writing" (Cser 1939, 15). Of these, the length of words—that is undoubtedly a decisive factor—is irrelevant here as the language of the two experiments was the same, thus what remains is the array of causes that we also assumed (albeit in a different wording), i.e., the size of vocabulary and ease of lexical access, as well as (to some extent) the speed of writing.

The factors having to do with the historical change of the language can be illustrated by an analysis of the conceptual areas involved. That analysis is partly one of content and partly one of a statistical nature. In the following comparisons with Cser's material, relative frequency is invariably computed with respect to the actual number of subjects mentioning that particular category. The analysis encompassed the following aspects: **1.** How dominant is the given conceptual area for the given age group? This may be revealed by (a) what percentage of the 400 subjects wrote words belonging to that area—cf. the second column of Table 4; (b) what percentage of all occurrences is made up by words belonging to that area—cf. the fifth column of Table 4. **2.** Are there "girlish" and "boyish" conceptual areas? Cser does make such a distinction. For instance, he says that boys are interested in fight, technical progress, etc., whereas topics like colours, foodstuffs, etc. are more characteristic of girls. He draws this conclusion from a comparison of the number of frequent words (occurring more than in 5%) of a given conceptual area mentioned by boys, respectively by girls. In our own material, we made the following calculations in this respect. (a) Among subjects who wrote words in the given area, what is the proportion of girls vs. boys—cf. the third column of Table 4. (b) For all words of all conceptual areas, we performed a two-way ANOVA test for the factors gender and age group. This shows whether there are significant differences by gender or by age group in the number of words written per person. In Table 4, the fourth column shows the average number of words written by those who activated words in the given area. Figures in bold stand for cases where the gender distinction was significant. (c) For frequent words—meaning words that occurred 20 times or more—what are the areas where the difference between girls and boys is 20% or larger. (The calculations in (a) and (b) were based on all occurrences, those in (c) were based only on words that occurred in at least 5%, i.e., 20 times or more.)

*Table 4*

Conceptual areas, occurrence, distribution, and proportions

| CONCEPTUAL AREA | CHILDREN MENTIONING WORDS BELONGING THERE (%) | GIRLS VS. BOYS (%) | | AVERAGE NUMBER OF WORDS GIRLS VS. BOYS | | PROPORTION OF OCCURRENCE (%)* |
|---|---|---|---|---|---|---|
| Animals | 93 | 50.8 | 49.2 | 10.96 | 10.47 | 8.02 |
| Plants | 90 | 53.3 | 46.7 | **4.05** | **3.55** | 2.77 |
| Colours | 51 | 64.2 | 35.8 | **4.75** | **3.92** | 1.83 |
| Occupations | 63.25 | 53 | 47 | 2.31 | 2.54 | 1.24 |
| Nationalities | 26.25 | 56.3 | 43.7 | 2.13 | 2.31 | 0.47 |
| Food | 88.75 | 50.7 | 49.3 | **6.22** | **5.05** | 5.41 |
| Body parts | 84 | 53.3 | 46.7 | 6.10 | 5.39 | 3.93 |
| Clothing | 95 | 51.3 | 48.7 | **11.02** | **7.53** | 7.25 |
| House & household | 97 | 50.5 | 49.5 | **16.15** | **11.38** | 10.84 |
| Traffic | 83.25 | 47.7 | 52.3 | **2.81** | **3.64** | 2.18 |
| Engineering | 91 | 49.7 | 50.3 | **4.09** | **4.79** | 3.26 |
| Nature | 87 | 51.7 | 48.3 | 5.59 | 4.89 | 3.68 |
| Materials | 70 | 50.6 | 49.4 | 2.45 | 2.74 | 1.51 |
| Leisure, sports | 96.5 | 51.3 | 48.7 | 6.84 | 6.15 | 5.06 |
| Tools | 78.25 | 50.2 | 49.8 | 3.01 | 3.15 | 1.94 |
| School | 99.25 | 50.6 | 49.4 | **13.89** | **11.13** | 10.03 |
| Curriculum | 82.5 | 50.3 | 49.7 | 5.07 | 4.31 | 3.1 |
| Man | 77.25 | 53 | 47 | **5.18** | **3.76** | 2.8 |
| Negative | 47.25 | 50.3 | 49.7 | 2 | 2.49 | 0.85 |
| Abstract noun | 77.75 | 50.5 | 49.5 | **7.29** | **4.94** | 3.84 |

*Taking the whole corpus into consideration.

Our analysis of conceptual areas covered common nouns and "colours" which are adjectives. We started from the categories set up by Cser, and defined 19 conceptual areas in his terms, adding "abstract nouns". (Of these areas, 18 covered 93.6% of all occurring nouns.)

**Colours.** The corpus contains a total of 908 colour adjectives identifying 24 different colours: ***barna*** 'brown', ***bordó*** 'claret', *bordópiros* 'wine red', ***citromsárga*** 'lemon-yellow', ***fehér*** 'white', *fehéres* 'whitish', ***fekete*** 'black', *fekete-fehér* 'black and white', *feketés* 'blackish', *hupikék* 'gaudy blue', ***hupilila*** 'gaudy violet', ***kék*** 'blue', *királykék* 'royal blue', ***lila*** 'violet', ***narancssárga*** 'orange', *okkersárga* 'ochre', ***piros*** 'red', ***rózsaszín*** 'pink', ***sárga*** 'yellow', *sötétbarna* 'dark brown', *sötétzöld* 'dark green', ***szürke*** 'grey', ***vörös*** 'red', ***zöld*** 'green' (colours set in bold occurred three or more times; those underlined were only written by girls). 51% of all subjects mentioned some colour or colours. Among those writing colours, there were almost twice as many girls (64.2%) than boys (35.85). The girls wrote an average of 4.75 colours, significantly more than the boys' average 3.92. All colours occurring 20 times or more were written by girls a lot more times than by boys; the difference is largest for *rózsaszín* 'pink', and smallest for *vörös* 'red'. The frequency order is blue, green, black, red (*piros*), white, yellow, violet, brown, pink, grey, red (*vörös*). No boy mentioned *bordó* 'claret'.

Girls made more exact distinctions among shades of colour (with respect to sociolinguistic differences between genders in using colour terms, cf. Lakoff 1975, 8). Experimental investigation of Hungarian children and adults also confirmed this conclusion (Gósy 1998a). In Cser's material, the frequency toplist is different (red, green, blue, white, yellow, black), and shades (non-primary colour terms) are either missing or their frequency of occurrence has grown since (e.g., orange – relative frequency 0.2 → 3, pink – relative frequency 3.8 → 9).

**Occupations.** The most frequently occurring item is *tanár* 'teacher', together with its synonyms (e.g., *tanárnő* 'lady teacher', *tanító* 'primary school teacher', *pedagógus* 'pedagogue', *tanár néni* 'schoolmistress'). The tendency is similar in Cser's material. There is no significant gender difference, although girls wrote *orvos/doktor* 'physician' more often than boys did, whereas *rendőr* 'policeman' occurred more often with boys than with girls.

**Nationalities.** The full corpus contained 236 occurrences of 33 different names of nationalities. The sweep of *angol* 'English' (relative frequency: 2.9 → 13) may reflect a difference between the two historical/social periods. Another interesting difference is that of *olasz* 'Italian' (relative frequency: 3 → 1.25). The word *roma* 'Gypsy' was not attested in the old material.

**Animals.** The activation of names of animals was very frequent. In our material the number of all occurrences was 3981, that is, 8.02% of the whole corpus, containing 270 different names of animals. 93% of the 400 children wrote one or more names of animals. The most frequent ones, obviously the prototypical ones, were *kutya* 'dog' and *macska* 'cat'. It is a commonplace that names of animals constitute an important part of children's vocabularies. According to the two-way ANOVA test, age group is the determining factor, sixth-formers wrote 11.92 names of animals on average, whereas seventh-formers wrote significantly fewer, 9.52. Gender, however, is not a significant factor. Among names of animals occurring 20 times or more, girls more often wrote *delfin* 'dolphin', *mókus* 'squirrel', *cica* 'kitten', *malac* 'piglet', *hörcsög* 'hamster', *csiga* 'snail', whereas boys more often wrote *bika* 'bull', *galamb* 'pigeon', *őz* 'roe', *sas* 'eagle'. The largest increase of frequency as compared to Cser's material was found for wild species (in the frequency order of our own corpus: *zsiráf* 'giraffe', *delfin* 'dolphin', *bálna* 'whale', *cápa* 'shark', *hörcsög* 'hamster', *giliszta* 'worm', *pingvin* 'penguin', *jaguár* 'jaguar', *polip* 'octopus'). The largest decrease of frequency with respect to Cser's top list was found for *öszvér* 'mule', *szamár* 'donkey', *veréb* 'sparrow'. On the other hand, *teknős* 'turtle' (40) and *teknősbéka* 'tortoise' (8) do not figure in his material at all.

**Plants.** Names of parts of plants were also classified as belonging here. 90% of our subjects mentioned plants, but relatively few ones. General terms were frequent: *fa* 'tree', *virág* 'flower', *bokor* 'shrub', *növény* 'plant'. The most popular flower was *rózsa* 'rose', whereas among cereals *kukorica* 'maize' and *búza* 'wheat' had priority, again confirming the validity of protoype theory. Compared to Cser's list, an overall decrease of frequency characterises this category, with cereals losing ground to the largest extent. In his material plant names are among the "girlish" words; this is also found in our corpus (gender is a significant factor), although the difference is less spectacular than for colours.

**Food.** The most frequently mentioned foodstuff was *kenyér* 'bread' (85) followed by chocolate (79); with the occurrences of *csoki* 'chocolate (dimin.)' (60) and *csokoládé* 'chocolate' (19). In the rest of the frequency list, the relatively good position of *répa* 'carrot' is somewhat surprising. The most frequently mentioned drinks were *tej* 'milk' and *kóla* 'coke'; among alcoholic beverages, *bor* 'wine' scored highest. According to ANOVA, girls consistently wrote more items of food than boys did. The "girlish" food words were *pizza* 'id.', *torta* 'cake', *étel* 'food', *tea* 'id.', *cukor* 'sugar', *hamburger* 'id.', *só* 'salt', *vacsora* 'dinner', *leves* 'soup', *csoki* 'chocolate', *ital* 'drink', *hús* 'meat', *vaj* 'butter', *kóla* 'coke', *tejföl* 'sour cream', *kifli* 'crescent', *krumpli* 'potato', *bab* 'bean', whereas the single (frequent) food word that boys wrote a lot more often than girls did was *szalámi* 'salami'.

Cser's list obviously lacks a number of types of food as they were unknown at that time; in other cases, it is just the choice of name that is different. His subjects wrote *burgonya* 'potato', *fagylalt* 'ice cream'; ours preferred *krumpli* and *fagyi*, respectively. Among his top-scoring items, *főzelék* 'vegetable dish' lost the most ground. Alcoholic drinks not mentioned by his subjects were *pezsgő* 'champagne' (16), *whisky* 'id.' (11), *vodka* 'id.' (4), *alkohol* 'alcohol' (6), whereas the frequency of *sör* 'beer', *bor* 'wine', *rum* 'id.', *pálinka* 'brandy' diminished. The most frequently occurring fruit was *alma* 'apple' (137), followed by *körte* 'pear' (73) and *narancs* 'orange' (71). The frequency of *ananász* 'pineapple' and *banán* 'banana' had increased significantly since Cser's time. With fruits, too, the gender difference was significant (in favour of girls).

**Body parts.** In our corpus, the order is *haj* 'hair', *szem* 'eye', *láb* 'leg', *fül* 'ear', *kéz* 'hand', *fej* 'head', *orr* 'nose', *száj* 'mouth', *köröm* 'nail', *fog* 'tooth', *ujj* 'finger', *szív* 'heart', *nyak* 'neck' (with respect to *nyelv* 'tongue/language', written by 10 boys and 19 girls, it is difficult to tell which reading they meant). The order is similar in Cser's material. Gender differences are not significant, although some frequent body parts were written more times by girls: *köröm* 'nail', *kar* 'arm', *száj* 'mouth', *fog* 'tooth', *nyelv* 'tongue', *has* 'belly', *kéz* 'hand'. Private parts were of low frequency, but showed a characteristic gender distinction; boys mentioned them a lot more often (52) than girls did (6). In 32 cases (only with boys) the words chosen were obscene.

**Clothing.** This category includes pieces of clothing, their accessories (*cipzár* 'zip fastener', *zseb* 'pocket'), as well as jewels. The word *óra* 'watch/clock/hour/lesson' (mentioned by 136 boys and 131 girls)—that could in principle belong here just as well as to "school" (etc.)—was classified as belonging here because Cser did the same. 95% of all subjects mentioned words belonging here, representing 7.25% of all common nouns. The most popular ones were *cipő* 'shoes', *kabát* 'coat', *nadrág* 'trousers'; among accessories, *óra* 'watch', *szemüveg* 'glasses', and among jewels, *nyaklánc* 'necklace', *gyűrű* 'ring', *fülbevaló* 'earrings' was the top order. ANOVA indicates a clear gender difference: girls wrote 10.46, whereas boys wrote 6.95 items of clothing on average. The words *hajgumi* 'rubber hairband', *szoknya* 'shirt', *zsebkendő* 'handkerchief', *gyűrű* 'ring', *bugyi* 'panties', *nyaklánc* 'necklace', *esernyő* 'umbrella', *nadrág* 'trousers', *cipőfűző* 'shoelace', *farmer* 'jeans', *szemüveg* 'glasses', *sapka* 'cap', etc. were more frequently mentioned by girls than by boys; interestingly, *melltartó* 'bra' occurred more often in boys' than in girls' lists.

Underwear was amply represented, although the frequency of the individual items was relatively low. Among items of underwear that were only mentioned by boys, or that were mentioned by more boys than girls, the various names for 'men's drawers' were on top: *alsógatya* (4), *gatyó* (2), *alsónaci* (1), *alsónadrág* (1), *férfialsó* (1), respectively *gatya* (boys: 14, girls: 4), *bokszeralsó* (boys: 3, girls: 2). Among words for girls' underwear, *bugyi* 'panties' was the most frequent (boys: 8, girls: 19); others occurred more or less sporadically (*tangabugyi* (boys: 10, girls: 2), *tanga* (boys: 3, girls: 2), *bugyogó* (boys: 1, girls: 1)). The neutral terms *alsónemű* 'underwear' (boys: 2, girls: 3), *fehérnemű* 'lingerie' (boys: 2, girls: 9), occurred more with girls than with boys. The most frequent word that was only written by girls was *top* 'id.' (7).

The largest increase compared to the frequency values found by Cser can be seen for *bugyi* 'panties', *pulóver* 'sweater', *bakancs* 'boots', showing the various sources of changes clearly. These days, varous types of underwear are less taboo—in Cser's list only *fehérnemű* 'lingerie' appeared with 19 occurrences. Usage and fashion have both changed. Words that show a large drop in frequency are also as expected. Sixty years ago *kötény* 'apron' occurred 171 times, *gallér* 'collar' 127 times; today, both were mentioned 4 times only. The "disappearance" of *kalap* 'hat' is also conspicuous: in Cser's material it occurred 348 times, in ours it occurred 38 times (relative frequency: 34.8 → 9.5). In all, words for clothing had a much larger share in the old material than they had today.

**House and household.** This category contains words connected with residential buildings, their furnishings (following Cser, also objects that are typically found around a house like *kút* 'well', *kutyaól* 'dog-house'), and pieces of furniture. It was one of the conceptual areas represented in large numbers. The most poular words were *szék* 'chair' (264), *asztal* 'table' (247), *ablak* 'window' (230), *ajtó* 'door' (205), *ház* 'house' (198), that is, the prototypical items. Gender differences were again significant. *WC* 'toilet' did not occur at all in Cser's material; of its synonyms, only *illemhely* (3) and *toalett* (3) were to be found. With our subjects, *WC* occurred 55 times, and *budi* twice. Words that showed the largest increase of frequency were *csempe* 'wall tile' (relative frequency: 0.2 → 8.5), *fürdőszoba* 'bathroom' (relative frequency: 0.7 → 6.75). The largest decrease of frequency was shown by *roló* 'roller-blind', *mennyezet* 'ceiling', *kályha* 'stove', *sámli* 'stool', *fogas* 'coat-rack'. In Cser's list, *kályha* 'stove' occurred 458 times, today it occurred only 33 times (relative frequency: 45.8 → 8.25); on the other hand, *radiátor* 'heater' that obviously did not occur in his list at all, was mentioned 88 times by our subjects (relative frequency: 22).

The category "house" includes words for "household", too: this is where words referring to objects found in one's home, including kitchen and bathroom articles, household utensils, perfumery, as well as bed-linen were collected. The most frequent items were *villa* 'fork' (76), *kanál* 'spoon' (72), *pohár* 'glass' (70). Of words having to do with sanitation and cosmetics, *szappan* 'soap' (46), *körömlakk* 'nail varnish' (40), *fogkefe* 'toothbrush' were the most frequent. As expected, girls wrote a significantly larger number of words in this area.

**Traffic.** Cser's category "technical progress" was divided into "traffic" and "engineering" (see below). The most frequent word within the area of "traffic" was *autó* 'car' (210), to which we can add *kocsi* 'car' (41) and *gépkocsi* 'motorcar' (2); the next one was *repülő* 'aeroplane' (76), *repülőgép* 'aircraft' (11). The largest drop in frequency concerned *autóbusz* 'motor bus' (our subjects wrote *busz* 'bus' instead), *mozdony* 'locomotive', *villamos* 'tram' (this perhaps because trams are less used in the country than in Budapest where all of Cser's subjects were from). The relative frequency of *autó* 'car' grew from 33 to 52.5. Gender differences were significant, this time in favour of boys.

**Engineering.** This is where the words of telecommunication, computer technology, household appliances, machines and engines, and other technological terminology were collected. The most frequent items were *tévé* 'television' (163, plus *televízió* 46) and *számítógép* 'computer' (131, plus *komputer* 2 and *computer* 2). Boys wrote a larger number of "engineering" words than girls did, and seventh-formers more than sixth-formers did. In addition to *tévé* and *számítógép*, there were 33 other lexemes, a total of 103 occurrences. Boys wrote e.g., *traktor* 'tractor', *hangfal* '(hi-fi) speaker', *gép* 'machine', *űrhajó* 'spaceship', *égő* 'bulb', *CD* 'id.' a lot more often, whereas with girls *mosógép* 'washing-machine', *számológép* 'calculator', *magnó* 'cassette deck', *videó* 'video recorder', *televízió* 'television' occurred similarly more frequently. It is not surprising that the overlap with Cser's material is rather slight in this category; a mere 15% of all lexemes belonging to this area occurred there, too.

**Nature.** The most frequent words were *víz* 'water' (144), *hó* 'snow' (110), *föld* 'earth' (76), *folyó* 'river' (74), *hegy* 'mountain' (65). In ANOVA terms, gender was not significant here, but its correlation with age group was; especially 13-year-old girls wrote relatively many, and 13-year-old boys wrote relatively few, words in this category. The largest gender difference was shown by the names of seasons; for some reason, it was primarily 13-year-old girls who mentioned them.

**Materials.** Frequent names of materials were *üveg* 'glass' (120), *arany* 'gold' (75), *vas* 'iron' (63). Neither gender nor age group was significant. The differences with Cser's list were typical again: *beton* 'concrete' was ten times more frequent in our case, whereas *szén* 'coal', *ólom* 'lead', *selyem* 'silk', *márvány* 'marble', *vászon* 'linen' were included a lot less often.

**Leisure, sports.** The most popular toy (or sports requisite) was *labda* 'ball' (117); the next most frequent word occurring here was *játék* 'toy/game' (103); adding up synonyms, 'bicycle' occurred in the largest number (*bicikli* 101, *kerékpár* 18, *kerő* 1, *bicó* 1). There was no significant gender difference, but significant "gender → age group" differences were found again (13-year-old girls wrote a lot more words belonging here than 13-year-old boys did). Cser's material lacked *foci* 'soccer' but included *futball* '(association) football' instead.

**Tools.** The most frequent tools were *kés* 'knife' (93), *olló* 'scissors' (76), *cső* 'pipe' (57), *csavar* 'screw' (49), *doboz* 'box' (44), *kalapács* 'hammer' (42), *tű* 'pin' (42). Gender and age group were not significant, although there were characteristically "boyish" words like *csavar* 'screw', *kötél* 'rope', *cső* 'pipe'. The lexemes *kalapács* 'hammer' and *szeg/szög* 'nail', however, were written by equal numbers of boys and girls.

**School.** This category included names of school subjects, and typical objects, concepts, and persons of school life. It is a very important conceptual area, all except three children wrote words belonging here, and 10% of all occurrences come under this heading. Statistically, it is an unanimously "girlish" category. The most frequent words were *toll* 'pen' (303), *ceruza* 'pencil' (295), *könyv* 'book' (283), *tábla* 'blackboard' (278), *tolltartó* 'pencilbox' (249). Compared to Cser's material, the largest drop in frequency was shown by *számtan* 'arithmetics', *töltőtoll* 'fountain-pen', *tinta* 'ink'; the first one of these was replaced by *matek* 'maths' or *matematika* 'mathematics'.

**Curriculum.** This is where lexemes belonging to the terminology of some school subject or field of science were classified. The most frequent ones were those occurring very early in one's studies (e.g., *szám* 'number', *betű* 'letter', *vers* 'poem'). Gender and age group were not significant. 73.7% of words belonging here occurred less than three times (e.g., *allegória* 'allegory', *deltoid* 'deltoid').

**Man.** This is where we classified terms of kinship, words for people in their various ages, as well as words like *barát* 'friend', *osztálytárs* 'classmate'. Gender differences were significant; this was a "girlish" category again; but the words for various kinds of 'human being' were very frequent irrespective of the gender of the subject. E.g., *fiú* 'boy', *kölyök* 'kid', *kisfiú* 'little boy', *csávó* 'guy', *haver* 'pal', *nő* 'woman', *asszony* 'woman', *hölgy* 'lady'. Six different words were used for 'mother', with a characteristic cline of frequency: *anya* (94), *mama* (41), *anyu* (27), *mami* (3), *anyuka* (2), *édesanya* (2). In comprison with Cser, the most interesting thing was that *barát(nő)* '(girl)friend' gained frequency to the largest extent. The 6 occurrences of *barátnő* 'girlfriend' increased to 24 in sixty years' time (relative frequency: 0.6 → 6), and the 16 occurrences of *barát* 'friend' increased to 54 (relative frequency: 1.6 → 13.5). The occurrence of *család* 'family' was roughly three times as numerous as it had been sixty years before.

**Negative.** This is where words having to do with illness, war, death, crime, and drugs were counted. Also, words referring to e.g., homosexuality and other socially negative terms like *csöves* 'bum', *hajléktalan* 'homeless' were included here. Items of this category, a total of 653 occurrences (179 different words), were found with 59.75% of the subjects. Gender differences were not significant. Names of weapons, as expected, were written mainly by boys; only boys mentioned *puska* 'rifle' (28), *gépfegyver* 'heavy machine gun', *tőr* 'dagger' (3), *gépágyú* 'automatic cannon', *gránát* 'grenade', *harckocsi* 'tank' (2), and *géppisztoly* 'machine gun', *golyószóró* 'light machine gun', *mustárgáz* 'mustard gas', *páncélkocsi* 'armoured car', *plasztik* 'explosive', *rakétavető* 'rocket launcher', *stukker* 'shooter' (1). In the 'illness' subgroup, 12 common nouns reached the frequency value of 10; the subgroup contained 147 occurrences, 40 different words. Examples: *alkoholista* 'alcohol addict' (5), *influenza* 'id.' (5), *amnézia* 'amnesia' (3), *AIDS* 'id.' (2), *holdkóros* 'sleepwalker' (2), and *nyúlszáj* 'cleft palate', *reuma* 'rheumatism', *vakbélgyulladás* 'appendicitis' (1), *mentő* 'ambulance' (21), *beteg* 'patient/ill' (19), *kórház* 'hospital' (18), *seb* 'wound' (10). Illness and mortality were mainly on girls' minds. The word *halál* 'death' and *kórház* 'hospital' (12/6) appeared with twice as many girls (18) as boys (9), and the difference was even larger for *sír* 'grave/cry' (15/6), *beteg* 'patient/ill' (13/6).

**Other objects.** All objects that did not fit into any of the previous categories were collected here. This group consisted of 1544 occurrences, 181 different lexemes. Examples of items occurring 30 times or more: *kép* 'picture' (198), *levél* 'letter/leaf' (83), *kulcs* 'key' (72), *gyertya* 'candle' (66), *kosár* 'basket' (49), *zászló* 'flag', *fénykép* 'photograph', *koszorú* 'wreath'; examples of less frequent items in this category: *cigi* 'cigarette', *akvárium* 'fish-tank', *kupak* 'hood', *zacskó* '(paper) bag', *zsák* 'sack'.

**Abstract nouns.** In principle, nouns containing the derivational suffixes *-ás/-és* '-ing' or *-ság/-ség* '-ness', would have been clear candidates for this category. However, a number of them represented one of the above conceptual areas just as clearly. As a compromise solution, we classified the latter set (218 occurrences, 77 different lexemes) into the appropriate other categories; therefore, in this category we have all and only abstract nouns that did not fit into any of the previous ones (altogether 1905 occurrences). Of these, a mere 11 lexemes reach the frequency value of 20 (7.8% occur only once or twice). Abstract nouns mentioned 20 times or more were: *szerelem* 'love' (80), *szín* 'colour' (54), *írás* 'writing' (49), *idő* 'time' (47), *szeretet* 'affection' (38), *barátság* 'friendship' (33), *élet* ' life' (24), *áram* 'electricity' (22), *beszéd* 'speech' (21), *munka* 'work' (20), *öröm* 'joy' (20). The lexeme *élet* 'life' occurred 7 times with boys and 17 times with girls, similarly *öröm* 'joy' was mentioned 7 times by boys and 13 times by girls. Also, girls listed *szerelem* 'love', *szeretet* 'affection' and *barátság* 'friendship' severeal times as often as boys did. *Boldogság* 'happiness' was written by a single boy and 14 girls. A large number of different lexemes occurred here (649); this was the most populous group in terms of number of different lexemes. Gender differences were significant, in favour of girls. The correlation of genders and age groups was also significant: 13-year-old girls wrote the largest number of abstract nouns.

The question arises which conceptual areas are the most important for the children, i.e., which areas are represented the most heavily. This can be judged on the basis of the total number of occurrences within the given conceptual area, as well as according to what percentage of the subjects mentioned words belonging to the given area. The order in these terms is: **house and household, school, animals, clothing, food, leisure**. The order based on the percentage of the subjects mentioned words of a given area is **school, house and household, leisure, clothing, animals, plants, food**. As we have already mentioned, Cser says that there are "girlish" and "boyish" conceptual areas; that is, gender-bound differences in what is interesting for the subjects are reflected in free word associations. Our analyses have shown the following. Many more girls wrote words belonging to the areas of **perfumery** within the category of **house and household, colours, nationalities**, and **fruit** within the category of **food** (the difference was over 10% in each case) and **house and household** (where the difference was 9.8%). Girls wrote at least one word more (on average) than boys did in the categories food, clothing, school, man, and abstract noun. On the other hand, for **traffic**, the difference was 4.6% in favour of boys. Therefore, gender differences are indeed characteristic. On the basis of earlier word association experiments it was assumed that words are activated from both the active and passive parts of one's vocabulary. The data of the present investigation confirm the claim that words accessed in the active vocabulary constitute a larger part of the total number of words activated, given that this is what explains the unambiguous distinction between "girlish" and "boyish" conceptual areas. According to our statistical analyses, gender was a determining factor, whereas age group was significant only for **animals**. It appears that this conceptual area loses some of its importance as the child grows older.

## 4. Free word associations at the age of six

From a certain age onwards and to some extent, even nursery children are capable of word associations (given a CV syllable as trigger, they are able to access an existing word or several existing words already at the age of 4–5, cf. Gósy 1999a). However, we have been unable to find data in the literature concerning an investigation in which children were to say words one after the other, with no limitation whatsoever. Word associations—as we saw above—provide us with valuable information concerning characteristics of the processes of access to the mental lexicon and the strategies employed, hence they are a good tool of analysing children's development. Therefore, we conducted another experiment involving 6-year-old nursery children in order to learn if they are able to activate their mental lexicon by the strategy of free word associations, as well as what the results of such activation may be. We did not even have a vague notion of how many and what kinds of lexical items a small child of this age would be able to activate within a given period of time. Although a comparison with the material of schoolchildren (see above) is not unambiguously possible because of the differences in the number of subjects and methods of experiment, the acquired data make us able to draw some conclusions and recognise some tendencies.

In this experiment, 19 six-year-old (between 6;1 and 6;8) nursery school children participated (8 girls and 11 boys) in the framework of the afternoon leisure activities in the nursery (this being exactly as familiar surroundings as the classroom is for schoolchildren). The experiment was conducted by the nursery teacher of the children, on the basis of instructions given to her. Testing was done individually. The children got the following task: "Say things like *ball*, *sleeps*, *joy*, *sweet*, as many as you can", that is, the model list contained words belonging to diverse parts of speech. Subsequently five minutes were at each child's disposal to activate words that were immediately put down in writing by the nursery teacher. One third of the fifteen minutes allotted to schoolchildren was allowed because of the age difference and the oral nature of the task. Most children were able to go on activating words for some four minutes.

The children were able to solve the task; they uttered a total of 709 mental words. The average values obtained are given in Table 5. The six-year-olds tested were able to activate an average of 7.46 words per minute in this setup of free word association.

*Table 5*

Numerical results of free word associations by nursery children

| GENDER | MEAN | STANDARD DEVIATION |
|---|---|---|
| Boys | 37.81 | 14.35 |
| Girls | 36.62 | 13.41 |
| Total | 37.31 | 13.59 |

Girls and boys practically did not differ in the number of words activated. The fewest words activated by a child were 17, the largest score was 66. Girls activated a total of 191 different lexemes, 23.87 on average, whereas boys listed a total of 255 lexemes, 23.18 on average. The total number of mental words given above (709) does not include repetitions (by the same child). The incidence of repetitions was very large, 12 out of the 19 children did produce repetitions (this is 63.2%, the same figure for schoolchildren was 67.25%). The repetitions constituted 8.38% of all activated items (on average). Compared to the data of the schoolchildren, this is many times as large as the value we got there (1.85%). Table 6 shows the numerical comparison of repetitions.

*Table 6*

A comparison of repetitions

| SCHOOLCHILDREN | | | NURSERY CHILDREN | | |
|---|---|---|---|---|---|
| GENDER | MEAN % | STANDARD DEVIATION | GENDER | MEAN % | STANDARD DEVIATION |
| Boys | 2.01 | 1.25 | Boys | 5.87 | 3.38 |
| Girls | 1.69 | 1.13 | Girls | 13.40 | 5.35 |
| Total | 1.85 | 1.20 | Total | 8.38 | 5.37 |

We have analysed the part-of-speech distribution of the data. Of the 709 mental words obtained, 704 were nouns, 4 were adjectives (*elektromos* 'electric', *világos* 'clear', *plüss* 'plush', *barna* 'brown'), and 1 was an adverb (*korán* 'early'). There were a few lexemes that are in principle ambiguous in terms of part of speech (*szív* 'heart/inhale', *hal* 'fish/die', *fal* 'wall/devour', *nyúl* 'rabbit/reach for', *ég* 'sky/burn', as well as *repülő* 'aeroplane/flying', *dongó* 'bluebottle fly/buzzing', *kuka* 'dustbin/tongue-tied', *üdítő* 'soft drink/refreshing'). These were counted as nouns. We had anticipated (on the basis of the data of the schoolchildren) that an overwhelming majority of the words would be nouns, especially that this is the dominant part of speech at the early stages of language acquisition. That assumption was borne out by the data. Of the 704 nouns, 671 were common nouns and 33 were proper nouns, of which 15 were first names. It is conspicuous that not a single verb occurred (the few noun/verb items listed above are almost certain to have been meant in their nominal function).

The six-year-olds mentioned very few suffixed words, a total of 11, that is, 1.5%. All of these suffixed words were plural nouns, e.g., *állatkák* 'little animals', *videokazetták* 'videotapes', *majmok* 'monkeys', *békák* 'frogs', *ceruzák* 'pencils', *könyvek* 'books', *halak* 'fish (pl.)', *virágok* 'flowers'. (Note that almost half of these plural words were activated by the same little boy.) The three most frequently occurring items were *virág* 'flower', *szék* 'chair', and *asztal* 'table', whereas with schoolchildren they were *toll* 'pen', *ceruza* 'pencil', and *könyv* 'book'. That is, in both groups, words for the objects of the children's immediate surroundings were top scoring. The average number of syllables was 2.32, roughly the same as the corresponding figure for schoolchildren.

The word associations of six-year-olds contained sequences of words in which activations based on semantic, morphological, and/or phonological similarities could be found. However, due to the relatively small number of items, the frequency of accessing strategies is hard to determine reliably. It was the semantic strategy that occurred the most often, e.g., *virágtaró* 'flower stand', *virág* 'flower'; *baba* 'doll', *Barbi baba* 'Barbie doll', *napocska* 'sun', *felhő* 'cloud', *elefánt* 'elephant', *zsiráf* 'giraffe' or *szék* 'chair', *asztal* 'table', *ágy* 'bed', *szekrény* 'cupboard'. Sequences based on phonological similarity include *szekrény* 'wardrobe', *szem* 'eye', *virág* 'flower', *villanykörte* 'lightbulb'; *kabát* 'coat', *kacsa* 'duck', *harang* 'bell', *halak* 'fish (pl.)', *gomba* 'mushroom', *gomb* 'button', *szék* 'chair', *szél* 'wind', *társasjáték* 'indoor game', *táska* 'bag'; *kamion* 'truck', *kacsa* 'duck'. Examples of associations that can be claimed to be morphological: *csibe* 'chicken', *csibe lába* 'chicken's leg', *zsebóra* 'pocket watch', *zseblámpa* 'pocket torch', *szekrény* 'cupboard', *szekrény lábai* 'legs of cupboard'. The following can be seen as mixtures of semantic and morphological effects: *villany* '(electric) light', *villanyoszlop* 'pole', *virág* 'flower', *virágszál* '(a single) flower'; *tyúk* 'hen', *tyúkól* 'hen-house'; *baba* 'doll', *babakonyha* 'doll kitchen', *babakocsi* 'pram', *fésű* 'comb', *fésűtartó* 'comb case', *gáztűzhely* 'gas-range', *gáz* 'gas'. An interactuion of semantic and phonological factors may have produced *maci* '(teddy) bear', *majom* 'monkey'. The following sequence probably shows all three effects: *víziló* 'hippo', *víz* 'water', *vízisikló* 'grass snake'. All this suggests that the claim that children are prone to employing predicative constructions in their word associations was not borne out in our case (Sigurd 1996).

Comparing the lexemes listed by nursery children and schoolchildren, we can observe certain age-bound characteristics. The 354 lexemes of six-year-olds contained 44 (12.4%) that did not occur in the schoolchildren's material; these words are probably members of the passive vocabulary of the older, and of the active vocabulary of the younger, children. These words (i) have to do with "diminution": *halacska* 'fishlet', *emberke* 'little fellow', *kisegér* 'little mouse', *kisautó* 'toy car'; (ii) refer to toys for small children: *babakonyha* 'doll kitchen', *autóskártya* 'car card', *építőkocka* 'building bricks'; (iii) may go back to the differences in the immediate surroundings: *irattartó papucs* 'filing jacket', *fésűtartó* 'comb case'; (iv) occur in a different shape, e.g., *teknőc* 'turtle', rather than *teknős* 'tortoise'; or (v) are relevant for some personal reason like *egészségház* 'health care center', *orrszívó* 'nose pump', *dekóder* 'decoder'.

The results of our analysis of conceptual areas are also revealing. Of the areas we established for the schoolchildren, the ones that were (practically) missing were the **colours** (except *barna* 'brown'), **negative** items (except *fegyver* 'weapon'), obviously **curriculum** (except *betű* 'letter', *szám* 'number'), **occupations** (except *doktor* 'doctor', *orvos* 'physician', *bohóc* 'clown'), **abstract nouns** (except *memória* 'memory', *áram* '(electric) current'), **tools** (except *hőmérő* 'thermometer', *kalapács* 'hammer', *olló* 'scissors', *doboz* 'box', *zsinór* 'string'). Similarly, just a few items (1–3%) occurred in the categories **man** (e.g., *apa* 'father', *anya* 'mother', *gyerek* 'child', and *pólyás baba* 'baby'), and **materials** (*gyurma* 'plasticin', *plüss* 'plush'-these two may refer to the relevant toys-and *arany* 'gold', *kő* 'stone', *üveg* 'glass'). The category **body parts** included 18 occurrences of 12 lexemes, e.g., *haj* 'hair', *orr* 'nose', *szem* 'eye', *szív* 'heart'. The conceptual area **engineering** was represented by 19 occurrences of 12 different words, e.g., *rádió* 'radio', *számítógép* 'computer', *videó* 'video', *televízió* 'television'. The next frequency range was constituted by areas whose representation was 3–5%. These were **school**: 12 different words, 26 occurrences (the most frequent items were *könyv* 'book', *lap* 'page', *ceruza* 'pencil'), **food**: 19 different words, 27 occurrences (primarily various kinds of fruit like *alma* 'apple', *dinnye* 'melon', *cseresznye* 'cherry'), and **plants**: 10 different words, 31 occurrences. The item *virág* 'flower' occurred the most often here, both for girls and for boys. Other words in this area were *fű* 'grass', *fa* 'tree', and *tulipán* 'tulip'. The category **traffic** was represented by 15 different words, 33 occurrences. The most frequent ones were *autó* 'car', *repülő* 'plane', *vonat* 'train', *hajó* 'ship'. **Nature** (including weather) was represented by 12 different words, occurring 30 times, respectively. The most frequent items were *akvárium* 'fishbowl', and *felhő* 'cloud', *föld* 'earth', *nap* 'sun'.

At the age of six, in the group tested, the most populous conceptual areas were **clothing**: 28 different words, 64 occurrences (the most frequent ones were *cipő* 'shoes' (8), *óra* 'watch' (6), *zsebkendő* 'handkerchief' (6)); **leisure** and sports: 35 different words, 71 occurrences (e.g., *lego* 'lego' (7), *mászóka* 'climbing toy', *kocka* 'cube' (6), *baba* 'doll' (5)); **house** and household: 60 different words, 126 occurrences, 18.6% of all mental words activated (e.g., *szék* 'chair' (11), *asztal* 'table' (9), *ágy* 'bed' (6), *ajtó* 'door' (6), *ház* 'house' (5), *szekrény* 'cupboard' (5)); and finally—as expected—**animals**: 71 different words, 138 occurrences, 20.4% of all mental words in this test (e.g., *elefánt* 'elephant', *kutya* 'dog', *majom* 'monkey' (6), *kígyó* 'snake', *macska* 'cat' (5), *oroszlán* 'lion', *víziló* 'hippo', *pillangó* 'butterfly', *zsiráf* 'giraffe', *cica* 'kitten' (4).

## 5. Conclusions

Our results have proved that the method of free word associations can be put to good use in a complex investigation of the mental lexicon. The children activated both their active and passive vocabularies. Although in an implicit way, the hypothesis "the faster lexical access is, the more words can be activated" was also borne out. At least, this appears to be the most straightforward explanation for the fact that there was a significant difference between the two age groups of schoolchildren concerning the number of lexemes activated. The older group also wrote longer words on average. On the other hand, the average length of words did not change between the six-year-old nursery children and the schoolchildren.

Seventh-formers wrote a lot more lexemes that were not mentioned by the other group. In terms of the whole corpus, the overlap between the two age groups, i.e., the proportion of lexical items occurring in both, was 37.62%. The individual differences were considerable, both in the younger and the older group. Girls were able to activate a larger number of words than boys (in both age groups). It was possible to discern "girlish" and "boyish" conceptual areas among associations. 12.4% of the words activated by the nursery children (these were the lexemes not mentioned by the two school groups) can be unambiguously assumed to belong to the passive vocabulary of the schoolchildren; the semantic analysis above gave a clear answer to why this was the case.

The facts that were revealed by our data concerning the characteristics of associations and the manner of lexical access all support the claim that the mental lexicon has a network-like structure. The detailed typology above was the first analysis (that we are aware of) of the structure of the mental lexicon and the strategies of access (phonological, structural, and semantic) for Hungarian speakers. It appears that with younger speakers semantic relationships are the dominant factor, but the use of structural and phonological criteria during the activation of the mental lexicon can be observed already at the age of six. Hence, the strategies of orientation within one's own vocabulary take shape relatively early on.

At present, there are no appropriate methods for establishing the size of a speaker's individual mental lexicon; therefore all hypotheses or estimates in this respect are equally important. The 400 children tested (200 girls and 200 boys) activated a total of over 50,000 mental words. If we assume that all children are familiar with all the lexemes in this corpus (7397 items including proper nouns and English words) and we furthermore assume that this is all they are familiar with, this would mean that between the ages of three and thirteen they have to acquire approx. 1.6 words a day (this is based on the approximately 1500 lexical items attested for 3-year-old children, cf. Gósy 1984 and Meixner 1976). It is likely that, in ten years' time, children are able to extend their vocabularies to a larger extent than this, even if such extension is not necessarily gradual over the whole ten years.

Our comparative analysis of the two word association experiments sixty years apart have revealed certain changes in linguistic knowledge and language use. Today's children wrote over 14,000 words more than their "grandparents" did; the difference being 2.4 words per minute. This makes it probable that the vocabulary of children is larger today (an important contributive factor may be television); but it is also possible that their lexical access is (also) superior, due to the requirements of faster speech rate (among other things). 68.8% of Cser's corpus occurred in our own material, too. Since the latter is a much larger set of words, this common stock is only 35.6% of the words activated by our subjects. 55.8% of the common core falls within the same frequency range (cf. Figure 4).

The differences in the extent to which individual conceptual areas are represented in the two materials are characteristic and reflect general changes in way of life, society, technical devices, environment, and spheres of interest. The two corpora illustrate changes in usage and differences in what counts as "taboo". From a pedagogical point of view it is interesting—and may be due to certain changes in the principles of upbringing (family? school?) or in social norms in general—that today's children hardly constrain their performance in word access tasks. They do not hesitate to put down in writing a number of words that children would not even dare to think of sixty years ago (including even *bugyi* 'panties'). School expectations may underlie the lack of diminu-

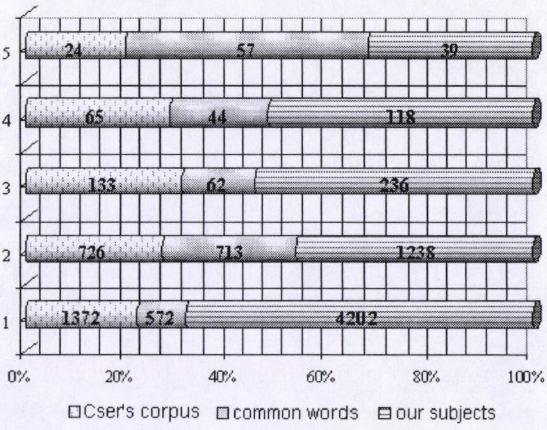


*Fig. 4*
Common and different words in the data collected 60 years ago and today (the units of the vertical axis are: $1 = n < 3$, $2 = 3 \leq n \leq 19$, $3 = 20 \leq n \leq 39$, $4 = 40 \leq n \leq 79$, $5 = n \geq 80$)

tive forms sixty years ago (for instance, in words for school subjects). There are predictable differences that go back to the "obsolescence" of certain words due to a variety of reasons, words like *szatócs* 'chandler', *pengő* 'old Hungarian currency', *mángorol* 'mangle' (verb), *penna* 'quill', *plajbász* '(lead) pencil', respectively *leadó* 'radio set/transmitter', *távirda* 'telegraph office', *sparherd* 'kitchen range', *stelázsi* 'tier-stand', *vegytan* 'chemistry', *ródli* 'sledge', *prakker* 'carpet-beater', *trén* 'Army Service Corps', *plint* 'plinth'.

The incidence of certain lexemes having to do with trouble or unpleasant phenomena has grown, e.g., *halál* 'death' (relative frequency: $1.6 \rightarrow 6.75$), *baleset* 'accident' (relative frequency: $0.3 \rightarrow 3$). The words *drog* 'drugs', *gyilkosság* 'murder' did not at all occur sixty years ago, although *gyilkos* 'murderer' did. It is interesting that *bomba* 'bomb' hardly ever occurs in Cser's material; in our own list even *atombomba* 'atomic bomb' crops up. (Sixty years ago, children tended to write *ágyú* 'cannon' and *kard* 'sword' instead.) Positive emotions are also more heavily represented in today's corpus, primarily *szerelem* 'love' (relative frequency: $0.5 \rightarrow 20$) and *barátság* 'friendship' (relative frequency: $0.2 \rightarrow 8.25$) but similar differences for *öröm* 'joy' (relative frequency: $1.6 \rightarrow 5$), *boldogság* 'happiness' (relative frequency: $0.2 \rightarrow 3.75$), and *nevetés* 'laughing' (relative frequency: $0 \rightarrow 3.5$) are also worth mentioning.

Both pedagogically and psychologically speaking, it is very important to draw the appropriate conclusions from individual differences among children.

The distance between children activating 24 (the minimum amount) and 222 mental words (the maximum amount) raises the issue of individual size of the mental lexicon and/or individual amount of successful access. (At the age of six the difference is less, the fewest is 17 and the largest is 66 words). All that interacts with communication processes and learning processes, hence it is considerably affecting the cognitive abilities, learning successes, and further development of the children. The individual differences in the process of first language acquisition, often extremely large ones, are familiar and are accepted as facts (especially in early stages of learning to speak). However, the word activation differences observed with six-year-olds forecast the possibility of those very large dissimilarities that we have attested with sixth- and seventh-formers. One year prior to starting school, there are children who are able to activate twice, three times, even four times as many words as some of their age-group peers. This is important because a successful and fast strategy of activating one's mental lexicon is indispensable for the appropriate working of the processes of both speech production and speech comprehension.

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# BILINGUAL SEMANTIC REPRESENTATION AND LEXICAL ACCESS

JUDIT NAVRACSICS

**Abstract**

This study presents evidence concerning semantic representation in bilingual memory. A vast majority of the early research on this topic proposed that fluent bilinguals access semantic representations that are shared across their two languages. More recent research proves that the question is not as simple as that. Bilinguals can sometimes use shared semantic representations across their two languages, but the conditions under which they can do so are constrained by the nature of the material, by the form of the task, by the level of proficiency in the second language, and by the lexical-level connections between the two languages. The present study provides an analysis of some psycholinguistic tests carried out among bilingual and bicultural people within a new framework proposing that there are asymmetries in the strength of the connections between lexical representations in different languages and between lexical representations and concepts. I will examine bilingual and bicultural semantic representations and their linguistic realisations, and the switching attitudes of bilinguals through the analysis of three tests conducted among bilingual and bicultural subjects.

## 1. Introduction

The mental lexicon is a kind of internal dictionary which contains not only the 'entries' for each word a speaker knows but also all the linguistic information about the word: its semantic content, syntactic properties, phonological shape, etc. Semantic memory, which is reflected in the lexicon, is not strictly linguistic since it contains the mental representation of the individual's knowledge of the world. This knowledge is represented in concepts and relations between these concepts (Appel–Muysken 1987). Studies of mental structure have never been easy to conduct and descriptions of cognitive and linguistic development are always fraught with inference and uncertainty. These difficulties are compounded when two languages occupy the linguistic domain of a person's mind (Bialystok 1998).

When studying the semantic representation of bilinguals, the structure of the bilingual mental lexicon and the connections of language, thought and culture must also be taken into consideration.

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Languages reflect the culture, beliefs, values and identity of people who speak them (Baker–Jones 1998). Culture is something that everybody has. It is not what is found in theatres, museums, universities, etc. The term refers to some property of a community which the members share and which might distinguish it from other communities (Hudson 1986). The connections between language, thought and culture have always been in the focus of attention.

The well-known Sapir–Whorfian hypothesis claims that language has a determining role over thought. Sapir spoke about language as a "tyrant" which defines experience, imposing upon us particular ideas about the world (cf. Steinberg 1993). Humboldt in 1836 declared that a language by its very nature represented the spirit and national character of a people. With reference to this statement, a German teacher was dismissed in the US after World War I, for fear of his influence upon the students' developing character. According to Whorf, speakers of different languages are led by the same physical evidence to the same picture of the universe only to the extent that "their linguistic backgrounds are similar or can in some way be calibrated".

From a psycholinguistic point of view, there are at least three considerable arguments against this presumption.

(i) If one holds that language is the basis for thought, one would have to argue that deaf children do not think. However, cognition can develop to a certain extent even in the absence of knowledge of any language. The reverse does not hold true.

(ii) Language can begin to be learned only when thought is sufficiently developed through the child's experience of objects, events and situations in the world (Steinberg 1993).

(iii) If the Sapir–Whorfian view were possible to be held, the multilingual would have as many different conceptual–perceptual systems of the physical world as many languages he or she has. If the language system formed thought, and if different languages formed different systems, then bi- or multilinguals would form more than one system of thought. If multilingual persons had many different thought processes, such persons would not have coherent intelligence or personalities (Steinberg 1992). Different ideas would be involved with the different languages. Then bilinguals would have difficulty in using the knowledge gained through one language when operating in the other language.

### 1.1. Mental representation

Our mental system provides us with an internal representation of the world, a microcosm, but that is certainly not a miniature world. It is what projects the projected world. In addition, it builds further structure by its own internal processing: thinking, figuring things out, deducing things, imagining things, etc. What we usually call direct experience is perhaps direct at the surface of the sense organs, but from there it is processed by the mental structures, perceptual and conceptual, that have been built largely on the basis of previous experience. What reaches our awareness is generally the result of several or many steps of selection and integration of what is received by the sense organs. It follows that the only thing we experience directly is our own mental activity (Lamb 1998).

Experientialist cognition (Lakoff 1987) takes experience as active functioning as part of a natural and social environment. It takes common human experience as motivating what is meaningful in thought. "Motivating" does not mean "determining" (Lakoff 1988). With regard to the cognitive systems, there are great similarities in the general outlines of the architecture combined with innumerable differences of detail between individual systems. As Lamb (1998) puts it, the resemblances are doubtless to be attributed largely to the common genetic inheritance of our human information processing apparatus, while the differences result mainly from different experiences of individual cognitive systems during their diverse lifetimes.

In monolingual cases, building up the mental lexicon takes place while acquiring L1, however, it is subject to changes all through the person's life. Recalling is a reconstruction of the very mental state in which the given information was fixed (Gósy 1998b). Different languages make different distinctions explicit and have different patterns of lexicalisation. Macroplanning is language-independent, microplanning is language-specific (Green 1993). In the case of bilinguals, the relationship between a given L2 word and a given L1 word in the mental lexicon will vary from individual to individual, depending on how the words have been acquired and how well they are known, and also on the degree to which formal and/or semantic similarity is perceived between the L2 word and the L1 word in question (Singleton 1999).

Now the question is how the mind accommodates two linguistic systems and how reality is reflected through linguistic devices. Do bilinguals store information centrally and do they have equal access to it with both languages, or is information storage linked to separate languages, i.e., in two separate mental lexicons (Appel–Muysken 1987)?

One important model for bilingual representation is that developed by Kroll and her colleagues (Kroll 1993). In their framework, the lexical representations for the two languages are represented independently of each other but they share a single conceptual representation. As language proficiency increases, the connection between the word and its meaning becomes more direct, relying less on a mediating connection through the L1 lexicon. The degree of meaning similarity between the words within a translation pair may ultimately determine the bilingual representational form. The more similar the meanings of the translations, the more likely they are to be stored compoundly in the mental lexicon. For many words in one language a truly equivalent term does not exist in the other language (de Groot 1993).

From a neurophysiological aspect, a tentative conclusion based on studies of polyglot aphasia is that different languages are generally represented in the same area of the brain. It had long been wrongly thought that bilinguals use the right hemisphere more than monolinguals do, especially bilinguals who acquired a second language after childhood. Paradis (1981) proposes that languages are stored in a single-extended system, but the elements of each language form separate subsystems within a larger system.

### 1.2. Bilingualism and biculturalism

Bilingualism, according to Grosjean (1996), is the regular use of two or more languages or dialects in everyday life. **The bilingual is not the sum of two monolingual persons in one**, and very rarely can we find people who are balanced and equally fluent in their two or more languages. As he states in his *Complementary Principle*: "Bilinguals usually acquire and use their languages for different purposes, in different domains of life, with different people. Different aspects of life normally require different languages".

It is essential to refer to biculturalism when discussing the bilingual language representation. However, bilingualism and biculturalism are not necessarily coextensive. What is more, the balanced bicultural is as rare as the balanced bilingual. At the same time, everybody belongs to a number of cultures (or cultural networks), as Grosjean (1996) claims: major cultures (national, linguistic, social, religious, etc.) and minor cultures (occupation, sport, hobby, etc.). The criteria for biculturalism are as follows: **living in two cultures, adapting to them, and blending aspects of each**. Most biculturals have stronger ties with one culture than with another (at least in certain domains of life) but this in no way makes them less bicultural. According to Appel and Muysken (1987), it is cultural experience that seems to be important in establishing bilingual meaning systems rather than the acquisition context.

### 1.3. Language modes and code-switching

In their everyday lives, bilinguals find themselves in various language modes on a monolingual–bilingual mode continuum. A mode is a state of activation of the bilingual's languages and language processing mechanisms (Grosjean 1997). At one end of the continuum, bilinguals are in a totally monolingual language mode: they are interacting only with monolinguals. One of the bilingual's languages is active and the other is deactivated as much as possible. At the other end of the continuum, bilinguals are in a bilingual language mode: they are communicating with bilinguals who share their two (or more) languages and this is the state where language mixing (i.e., code-switching and borrowing) may take place. In this case, both languages are active but the one that is used as the main language of communication (the base or matrix language) is more active than the other. These are end points but bilinguals also find themselves in between, depending on such factors as interlocutor, situation, content of discourse and function of interaction.

Putting a bilingual in a monolingual language mode allows one to study interferences (and other types of deviations) more easily but these also occur in the bilingual language mode, along with code-switching and borrowings (Grosjean 1995). Switching is not simply a haphazard behaviour due to some form of 'semilingualism' but, instead, a well-governed process used as a communicative strategy to convey linguistic and social information (Grosjean 1992).

What is interesting is whether it is the language structure that determines code-switching or there are other factors influencing it? Wei (1994) puts the emphasis on the complex character of code-switching and, based on his research carried out in some Chinese speech communities in North-East England, he concludes that besides linguistic factors there are emotional, social, psychological factors that come into play as far as code-switching is concerned.

In what follows, I will examine bilingual and bicultural semantic representation and its linguistic realisation through the analysis of three tests conducted among bilingual and bicultural subjects. I will also examine the switching attitudes of bilinguals in their interviews and in other experimental situations.

## 2. Subjects and methods

40 bilingual and bicultural subjects participated in the study, 20 women and 20 men. They are very different in terms of their languages and cultures, and the way they acquired their language other than Hungarian is also diverse. They

all consider themselves bilinguals and biculturals in the sense of Grosjean's definition. The common factor about them is that they all live in Hungary and their language proficiency in both of their languages makes it possible for them to function as part of either language community, according to their needs. Table 1 contains the details about the subjects:

*Table 1*

Details of the subjects

| OTHER LANGUAGE | NUMBER OF SUBJECTS | BORN IN HUNGARY | BORN IN ANOTHER COUNTRY | AGE |
|---|---|---|---|---|
| Arabic | 2 | | 2 | 22, 48 |
| Chinese | 2 | | 2 | 14, 18 |
| Croatian | 2 | 1 | 1 | 23, 30 |
| Czech | 1 | 1 | | 25 |
| English | 12 | 3 | 9 | 15–37 |
| French | 1 | | 1 | 14 |
| German | 5 | 3 | 2 | 12–52 |
| Italian | 1 | | 1 | 32 |
| Rumanian | 2 | | 2 | 21, 25 |
| Russian | 4 | 1 | 3 | 19–43 |
| Serbian | 3 | | 3 | 22–38 |
| Slovak | 3 | | 3 | 22–40 |
| Vietnamese | 2 | | 2 | 18, 22 |
| **Total** | **40** | **9** | **31** | |

Table 2 shows the subjects' manner of becoming bilingual. For people belonging to the group of Bilingual First Language Acquisition (BFLA, Meisel 1989) the languages were used by both parents in accordance with the one parent–one language strategy (Ronjat 1913) from the very birth of the child. Another group of bilinguals is the one where subjects belong to the Bilingual Second Language Acquisition (BSLA, Meisel 1989) category which means a certain age difference (but not more than one or two years) in the onset of the acquisition of the second language. I added the category of Late Second Language Acquisition that covers any age after two years at which the acquisition of the second language started and which resulted in bilingualism.

As mentioned above, people belonging to the BFLA group have always been exposed to two languages, irrespective of where they live. It was the parents' responsibility to provide them with both languages. People in the BSLA group (with the exception of one English subject who is the child of English monolingual parents who came to Hungary to work here with their one-year-old daughter) were born in linguistic minority situations either in

*Table 2*

The categories of the subjects according to the ages of becoming bilinguals

| PEOPLE | BILINGUAL FIRST LANGUAGE ACQUISITION | BILINGUAL SECOND LANGUAGE ACQUISITION | LATE SECOND LANGUAGE ACQUISITION |
|---|---|---|---|
| Arabic | | | 2 |
| Chinese | | | 2 |
| Croatian | | 1 | 1 |
| Czech | 1 | | |
| English | 7 | 1 | 4 |
| French | | | 1 |
| German | 4 | | 1 |
| Italian | | | 1 |
| Rumanian | | 2 | |
| Russian | 1 | | 3 |
| Serbian | | 3 | |
| Slovak | | 3 | |
| Vietnamese | | | 2 |
| **Total** | **13** | **10** | **17** |

Slovakia, Serbia, Romania or in one case in Hungary (a Hungarian Croat). They all were exposed to their first languages at home, and started second language acquisition—the acquisition of the language of the society—in nursery schools at about age two. The Arabic, French, Italian and Russian subjects were born in their homelands (i.e., in Lebanon, Jordan, France, Italy and Russia, respectively) and they arrived in Hungary in their late teens or early twenties to study at university, to work or after getting married to a Hungarian. In their case we speak about late second language acquisition which resulted in a fluent Hungarian language proficiency.

As far as the subjects' culture is concerned, they consider themselves biculturals since they have lived and functioned as parts of society in cultures other than Hungarian, too. Even those who have always lived in Hungary have very strong links with their other cultures either because of their national identity or because of the parents' maintaining their culture and identity and they opt for being a part of both cultures.

In what follows, I will concentrate on people who belong to two major cultures. The cultures of the subjects—apart from Hungarian—are as follows: Western-European (13), Central-European (9), Eastern-European (6), Middle-East (2), Far-East (4), American (4), Australian (2). They were asked to carry out three experiments.

**Experiment 1. Interview**

First the testees and the experimenters had an interview on the subjects' linguistic history and background putting in this way the bilingual into the bilingual mode. They were asked how they felt about being bilingual, how they acquired their languages, what they considered to be the advantages or disadvantages of being bilingual, about their cultures, their identity, etc. The conversations were audiotaped, transcribed and analysed from many different points of view. Here it is the bilingual language behaviour that is in the focus of attention with a special emphasis on their code-switching mechanisms in different language modes. The base language was Hungarian.

**Experiment 2. Colour naming test**

The subjects were asked to search their mental lexicon for the appropriate entry (colour word) and name 30 different shades of the following basic colours presented one after the other: green, blue, yellow, red, purple, brown, pink and grey. The goal was to find out how culture is reflected in their thoughts and, consequently, in their linguistic realizations. The shades were taken from the colour chart of the computer. The test was conducted in Hungarian as the base language but the participants were encouraged to use either or both of their languages. The results (1200 items) were counted and categorised according to the shades and the basic colours (for a different analysis, see Navracsics in press) and then analysed according to the sex-related differences in colour naming and from the point of view of language mixing.

**Experiment 3. Word association test**

The subjects were given the task to give the very first word that came to their mind after hearing 188 Hungarian stimulus words one after the other. The words were identical with those enumerated in 'Hungarian Verbal Associations' edited by Balló (1983) and Jagusztinné Ujvári (1985) and used in experiments carried out among Hungarian monolinguals back in 1979 and 1981 in the Debrecen region. The test was oral and audiotaped. The responses (7520 items) were categorised according to the links between the prime words and the activated words, and were analysed from many different points of view (cf. Navracsics 2000a,b; Navracsics 2001a,b).

When studying bilinguals, special attention must be paid to the language mode the bilinguals are in at the time of observation. Grosjean claims it is critical that researchers control for the mode subjects are in when they are being recorded or tested experimentally. The original question of ours whether bilinguals have one integrated semantic system or two independent systems is confounded with the language mode issue. "Failure to control for the bilingual mode factor produces at best variable data due to the fact that subjects are probably situated at various points along the monolingual–bilingual continuum, and at worst ambiguous data given the confound between this factor and the variable under study" (Grosjean 1997, 10).

During the experiments the subjects were asked to use their languages without any constraints, so the possibility of a bilingual language mode was offered to them. In most cases it was promoted by the experimenters being bilingual themselves. There were just a few exceptions, i.e., the interviews with the Arabic, Chinese and Vietnamese subjects where the subjects and the experimenters did not share the same languages so the subjects were in a monolingual language mode. In this study, our main concern was the activation of the two languages in different language modes during the experiment. We studied the speech behaviour of the bilinguals, with a special emphasis on the differences in their language use while giving an interview and while carrying out the other two experiments, and analysed the reasons for the code-switches that occurred.

## 3. Results and discussion

**Experiment 1. Interview**

During the interviews the involvement of the two languages was under investigation, the speech behaviour of the subjects was analysed. The base language was Hungarian. From among the 40 subjects, 16 switched to the other language and 24 of them did not do so. Those who switched were all in the bilingual mode and most of them did the switch only when they were speaking about something unique to their culture other than Hungarian (customs, traditions, or schooling). All the subjects, even those whose speech behaviour was characterized by a Hungarian-only language use, confessed that they used both languages in different domains of life with different people and in different situations.

Being in a bilingual mode makes the participants of the conversation feel free to "go in and out of their languages" (Grosjean–Miller 1994) and thus a lot of code-switches were expected. However, the subjects did not switch frequently to their other language but when they did so, they had a good reason for that.

(i) *Person-related language use*

Ati (an English-Hungarian bilingual, 30), e.g., while giving the interview in Hungarian, was constantly talking aside to his daughter in English. However, the base language of the interview was so determining for him that, in spite of the experimenter's encouraging him to say anything in English that does not come to his mind in Hungarian, he said: *I studied Russian. És utána meg idejöttem* 'and then I came here', and so he switched back to Hungarian. The code switch was a very short one just to make the experimenter sure that he is convenient with his language use.

Suzanne (a German-Hungarian bilingual, 30), when speaking about how she talks to her children, said the following: *én inkább azt mondanám, hogy der Weihnachtsmann kommt, tehát hogy a Télapó jön* 'I would rather say that der Weihnachtsmann kommt, that is that Santa Claus is coming'. She quoted what she had said word by word and even switched the language but then she repeated the same in Hungarian even though she was aware that the experimenter spoke German, too.

(ii) *Context-bound language use*

Doris (an American-Hungarian, 20), e.g., when speaking about her school experiences back in the US, answered the Hungarian question: *És mit választottál*? 'And what did you choose?' in English: *Spanish and piano*. But then she went on basically in Hungarian and switched to English for just some words, which had Hungarian endings, e.g., *awardjaim* 'my awards'.

Zsuzsi (a Canadian-Hungarian, 19) did the same, e.g., *accenttal* 'with accent'. When she was trying to find the right word in Hungarian and the experimenter wanted to help her and asked in English: *Attitude?*, she answered: *Nem is attitude, hanem maybe his habits.* 'Not attitude but maybe his habits' where it is only some of the function words that are in Hungarian, the content words are in English.

Antonio (an Italian-Hungarian, 32) had an unexpected telephone call from Italy just before the interview. When the interview started, for a couple of seconds he spoke in Italian to the experimenter but then he switched to Hungarian, and there were no more code-switches during the interview.

Bernhardt (a German-Hungarian, 14) was also offered to use either of his languages. He wanted to do and did the interview in German, whereas during the other two experiments he used mainly Hungarian with some switches to German.

In the monolingual mode there were no switches at all, which shows that the subjects had a very strong control over their language use in the interviews.

**Experiment 2. Colour naming test**

In the data obtained, there were 1104 colour names altogether (8% of the answers were missing). Both the male and the female subjects were supposed to name a total of 600 colour shades. However, males did not name the colour in 11% and female subjects in 5% of the cases. The answers were put into the following categories with respect to the linguistic devices the subjects had chosen to express the most accurate shade:

(i) basic colour name (*green*, *blue*, etc.) consisting of one lexeme;
(ii) basic colour name plus quantifying adjectives: *light*, *medium* and *dark*;
(iii) basic colour name plus qualifying adjectives (*military green*, *brownish pink*, etc.)
(iv) basic colour name plus nominal qualifier (*sky blue*, *midnight blue*, *field green*, *peanut brown*, etc.)

Figure 1 shows the percentages of the different categories:

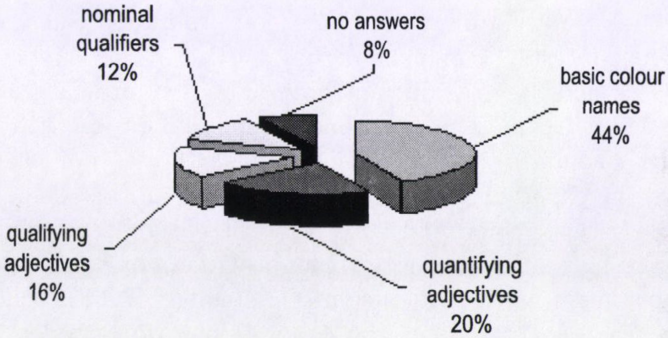


*Fig. 1*
Results of the colour naming test

The colour spectrum is a continuum which is generally parcelled out into six segments: purple, blue, green, yellow, orange, red (Steinberg 1992). In the data obtained, pink, brown and grey were added to the basic colour names. However, it was not essential to distinguish between the two colours yellow and orange from a linguistic point of view since the colour 'orange' is denoted by a compound word in Hungarian made up of 'orange' and 'yellow'. The Hungarian language treats this colour as a subcategory of the colour 'yellow'. As can be seen in this example, finer shades require a more elaborate vocabulary.

However, it is not always the same with different cultures. The Dani language of New Guinea, e.g., has only two colour words, one for light colours and one for dark colours (Steinberg 1992). Referring to what has been said in the Introduction, if language were the basis of thought and of the perception of nature, speakers of the Dani language would be expected to have perceptual difficulty in distinguishing colours they have no terms for, once they have a limited repertoire of colour terms. Research, however, has shown that this is not the case. Speakers of languages that have only two, three or four colour terms are as capable of perceiving differences in the visible spectrum as those whose languages have more than eight basic colour terms. People can see the differences but will not give them a name unless there is a good reason to do so. With regard to colour words, speakers who must remember a colour but do not have a word form for it have more trouble remembering it than speakers who do have such a form. Kay and McDaniel (1978), in a cross-cultural investigation, found no evidence in perception of colours for different language speakers. They conclude that '[...] rather than language determining perception, it is perception that determines language.' (Kay–McDaniel 1978, 610, quoted in Steinberg 1992).

How the habits of naming can affect our thinking can also be shown through recognition tests. The monolingual speaker of the Zuni language, e.g., presented with a small set of different colours and then asked after a period of time to pick out the ones he saw from a larger collection, will have trouble recognising the colours for which his/her language does not have convenient names. Where the experience is discrete, languages are apt to have more easily translatable terms. "It would be strange if *dog* or *tooth* did not have a same corresponding term in every language of the world, exactly equivalent at least in the central area of its meaning" (Bolinger 1968). But in continuums, like the visual spectrum, all the other things we experience are carved up in different ways.

The fact that the most frequently used category was the basic colour name itself (44%) proves that the subjects did not really have problems or hesitations in recognising the presented colours. What is more, there were no problems with the correct recognition of the colours, either. However, Figure 1 also shows that the speakers' structuring of the spectrum was not careful enough since they did not really make serious attempts at distinguishing the different shades. The second most frequently used method of naming was adding the quantifying adjectives 'light', 'medium' or 'dark' to the basic colour name (20%). Colour names with qualifying adjectives and nouns are the indicators of the subjects' attempts at being careful about naming the correct shades. These are altogether 28%, scarcely more than the second category. These expressions tell the most about the culture of the subjects. Their metaphors, similes talk about their views and their perception of the world. Their biculturalism is expressed in their use of colour names unusual in the Hungarian culture, e.g., *guerrilla green*, *midnight blue*, *sky blue*, *Adriatic blue*, *Adriatic green*, *lettuce green*, *lettuce blue*, *leaf green*, *moss green*, *sea-weed green*, *lichen green*, *sunset yellow.*

Figure 2 shows the same categories in terms of sex-related colour naming (data given in percentages).

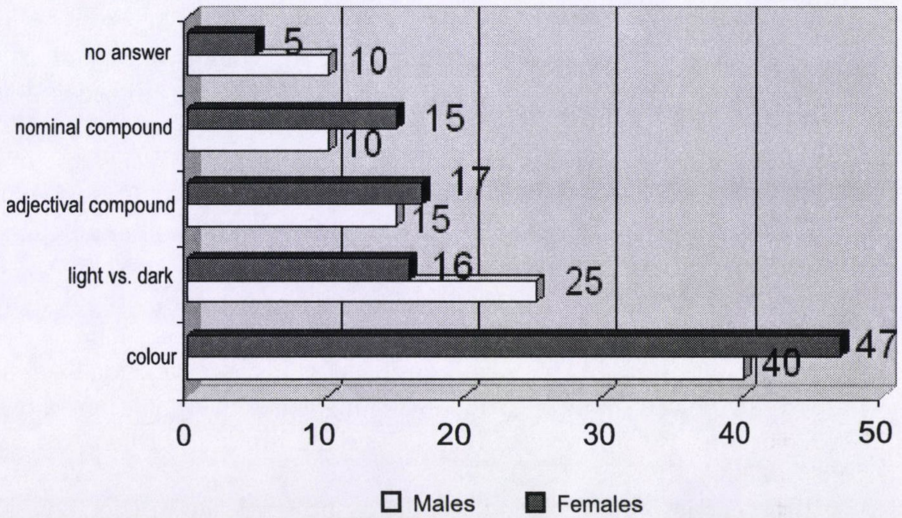


*Fig. 2*
Sex-related differences in colour naming

Females gave the basic colour name more frequently (47% as opposed to 40%), but they were also more active in responding with compounds consisting either of an adjective or a noun plus the basic colour name. Males, at the same time, preferred using the adjectives 'light' or 'dark' (the adjective 'medium' was used in only one case to express a shade of blue, see also in Navracsics in press). In the 'no answer' category it is again the males who outnumbered females in failing to express the shade or name the colour. It has been argued by Rich (1977) that sex-related differences in the colour lexicon may be the result of cultural factors including greater concern for clothing on the part of women.

Among basic colours, it was *red*, *pink* and *turquoise* which were the most frequently used ones, which means these are the colours which have no shades or at least their shades are the least observable. The analysis of the 'light' versus 'dark' qualifiers made it clear that *green* is the most popular in this category and the least popular ones were *orange*, *red*, *pink* and *gold.* Besides, it is usually the 'light' shade which is specified as opposed to the 'dark' one. Qualifying adjectives were used mainly with the colour *blue* whereas they were never used with *brown* or *red* colours. No nominal compounds were used for *red* or *pink*; however, lots of them were applied with the colours *yellow*, *green* and *blue*.

When judging the correctness of colour naming, we must state that the subjects were able to identify correctly the same colours. It was curious to see which colours were named identically by all the subjects. They were *brown*, *red* and *pink*. However, it was also discovered that the colours *dark yellow* and *greenish yellow* were named by all the participants as *green* or different shades of green. *Dark red* was identified as *brown* in the case of German-Hungarian subjects in 57%, in English-Hungarian subjects 92% and by all the rest of the participants in 100%, no matter what culture they belonged to. *Plum blue* was identified mostly as *brown* and *purple*, and just in a small number of cases as *blue*. *Blue* was sometimes named as *lilac* and vice versa.

There were no preferences in terms of colours concerning the language choice in the colour naming test. No particular colours induced code-switches in a very significant amount. I have examined the cases of code-switching in the eight basic colour names. Code-switching took place in the following percentages: brown: 30%, grey: 28%, lilac: 27%, blue and green: 24–24%, yellow: 23%, pink and red: 21–21%.

Not all the participants switched to the other language in the test. This means that there were subjects who consistently used only one of their languages. A complete lack of switches was found in the colour naming of 22 subjects. From among them, two English-Hungarian and one German-Hungarian subjects used only English and German, respectively, and the rest (18 subjects) used only Hungarian.

As for sex-related differences, 62% of male and 32% of female subjects switched to the other language while naming colours. From among the male subjects, code-switches occurred in 96% in the test of Pál (English), 93% in Ku (Vietnamese), 80–80% in Mihály (English) and Antonio (Italian). The English subjects were in a bilingual mode so there is nothing strange about their language choice, they knew that the experimenter understood what they were saying. However, the other two (i.e., the Vietnamese and the Italian) were in a monolingual mode, and still switched to their first language. They belong to the late second language acquisition category. No matter how fluent they are in Hungarian in their spontaneous speech, in a test situation, when trying to lexicalise their semantic representations, they turned to their dominant language in 80% of the cases.

Approximately to the same extent were both languages used in the tests of Szilvia (Slovak: 63%), Galina (Russian: 40%), Doris (English: 47%) and

Ati (English: 30%). They all were in a bilingual language mode with the exception of Szilvia. She was the one who seemed to ignore the fact that the experimenter did not speak her language, and again, just like in the case of the others who did not switch at all, her aim was to reflect reality the way she saw it, and the linguistic device for the execution was not considered.

What were the reasons for code-switching in the test?

(i) The exact colour name is only in the lexicon of the vernacular language of the subject, e.g., *sutmurasta*: Serbian, *trolevisna*: Croatian.

(ii) For a more exact expression of the colour name, e.g., *midnight blue*, *very rich colour of pink*: English, *lichen green*: Vietnamese.

(iii) Not knowing the right colour name in Hungarian, e.g., *turquoise*: English, *occramattone*, *celeste*: Italian, *gris*: French.

(iv) One word missing in the lexicon of one language may trigger a total switch to the other language, like in the case of Ati (English) who named the first 21 colours in Hungarian and then—not knowing the right name—he switched to English and, as a result, he named all the rest of the colours in English.

(v) Retrieval is quicker in the other language, supposedly due to frequency and the age at which the word was acquired. Galina and Nadeshda (both are Russians), e.g., named the basic colours in Russian; however, they named all the shades, the elaborate colours in Hungarian. This might be due to the fact that they spent their childhood in Russia being monolinguals. As Gósy (1998a) puts it, too, children usually use the basic colour names. Elaborate colour names appear only later. In their lexicons the basic colour names were more quickly accessible in Russian and the elaborate colour names in Hungarian.

In some cases actual code-switch did not occur, however, the cultural differences were reflected in mirror translations, e.g., *sea-weed green* (Vietnamese), *leaf green* (English), *field green* (Russian), *guerrilla green* (Serbian), *lettuce blue* (Russian), *salmon pink* (Slovak), *gold green* (German), *sky blue* (Croatian), *sunset yellow* (Croatian) which were named in Hungarian.

**Experiment 3. Word association test**

The total number of responses were 7520 items which were categorised according to the links between the prime word and the activated words. The following links were discovered during the test: semantic, syntactic, lexical equivalents, morphological, phonetic. Besides these categories, two additional ones were made up, the 'zero' category, where there was no answer, and the 'random' category, where no special links could be traced between the stimulus and the response.

Thus, the semantic category is made up of responses, independently of language, which belong to the same semantic field, synonyms, antonyms, idioms. Syntactic links can be discovered if the subjects used phrases which contain the stimulus word. The lexical category assumes direct associations between the lexical representations of the equivalent words in the bilingual's two languages. The morphological category involves words which are the results of word formation, compounding, affixation, etc. This category could be a subcategory of the semantic one. In the phonetic category, for various reasons, it is the sounds of words that elicit the retrieval. The reasons may be identical sounding (*hold* (English) = *tart* (Hungarian) – *hold* (Hungarian) = *moon* (English)) or very similar sounding due to neighbourhood effects, cognate and homophonous noncognate status.

Let us focus our attention on the switches between the languages. 14% of the responses were given in the other language by the subjects. The total number of code-switches contained the same categories as mentioned above. However, only 1% of the responses could be categorized as a switch based on a phonetic stimulus or whose links to the stimulus word could not be recognized. 21% of the code-switches give evidence of semantic links between the stimulus word and the response. In these cases, the semantic representation was expressed independently of the form, i.e., the subjects did not care about the actual language choice. They were rather conscious about conveying the information and trying to reflect what they had in mind in connection with the given stimulus word, e.g., *négyzet* 'square' – *corner*, *ablak* 'window' – *door*, *lassú* 'slow' – *fast*, *oldal* 'page' – *book*, *erdő* 'forest' – *zurka* 'trip' (Serbian), *fiú* 'boy' – *dievca* 'girl' (Slovak), *hosszú* 'long' – *krátki* 'short' (Slovak), *reggel* 'morning' – *večer* 'evening' (Slovak), *éhes* 'hungry' – *Wendy's cheeseburger*, *hely* 'place' – *Zagreb*, *kérdezni* 'to ask' – *repondre* 'to answer' (French), *ágy* 'bed' – *schlafen* 'to sleep' (German), *tolvaj* 'thief' – *prison*. This means that subjects applying this manner of retrieval have a common semantic representational system whose operation does not depend on the actual language being used. This is what Weinreich (1968) called compound bilinguals and what has been criticized so severely lately. According to Weinreich's theory, the compound bilingual has one conceptual system and different linguistic realizations.

The other category, as Weinreich puts it, is the coordinate bilingual who acquired his/her languages in different contexts and, consequently, the languages are labelled. This kind of bilinguals have lexical items for each concept belonging to each of their languages, and it is not so much the concept but rather the lexical item that is important for them. I consider subjects who used a lot of mirror translations in the word association test belong to this category since they gave responses like e.g., *szabad* 'free' – *free*, *ablak* 'window' – *window*, *Fenster* (German), *érteni* 'to understand' – *rozumet* (Slovak), *hely* 'place' – *mesto* (Russian), etc. An amazingly large number of lexical links could be observed in the test: 60% of the responses were actually mirror translations, which tells a lot about the subjects' language acquisition patterns. The subjects belonging to the coordinate category had acquired their languages in separated language contexts, either in the one parent–one language fashion or in situational contexts.

The syntactic links that were discovered in the data also tell about the language acquisition of the subjects. Quite a few of them used the stimulus words in a context, i.e., they put them in phrases and made sometimes whole sentences with them (18%).

Other triggers of code-switching were, e.g., phonetic similarities: *drága* 'dear' – *dragon*, *ad* 'give' – *add*, *öröm* 'joy' – *a room*, *tér* 'square' – *tear*, *vaj* 'butter' – *wire*, *beszél* 'speak' – *sailboat*, etc., but retrieval like this was less than 1%.

In what follows, I will compare the percentages of switches in both tests (WAT = word association test). Only those subjects are enumerated who exhibited code-switching (24 people altogether out of the 40).

14 subjects were in the bilingual and 10 in the monolingual language mode. Based on the presumption that people in the bilingual language mode switch between codes freely, here a large proportion of code-switches was expected in the bilingual, and a small number of switches in the monolingual mode. However, no significant differences were found in the amount of code-switches, as can be seen in Table 3 (overleaf). Or, at least, the differences in the majority of cases were apparently not due to the language mode.

Doris, Szilvia, Galina, Nadeshda, Ati, Mihály and Tamás were the ones whose switches were more or less balanced; they all—with the exception of Szilvia—were in the bilingual language mode. Christa and Zsuzsi did not switch at all, but they differed from the others in not switching from the guest language (i.e., the supposedly less activated language, Grosjean 1997) to Hungarian even though the base language of the experiments was Hungarian. They were also in the bilingual mode. Christopher used 100% English colour names but only 69% English responses in the word association test.

Marie-France and Antonio had significant differences in their language behaviour in the two tests: neither of them used their first language in the word association test but both of them did switch in the colour naming one.

*Table 3*

Code-switching expressed in % in Experiments 1 and 2

| NAME | LANGUAGE | LANGUAGE MODE | AGE | PERCENTAGE OF SWITCHES IN WAT | PERCENTAGE OF SWITCHES IN COLOUR NAMING |
|---|---|---|---|---|---|
| Christopher | English | bilingual | 14 | 69 | 100 |
| Ádám | Czech | monolingual | 15 | 12 | 0 |
| Tamás | English | bilingual | 15 | 32 | 10 |
| Marie-France | English | bilingual | 15 | 0 | 53 |
| Há | Vietnamese | monolingual | 18 | 36 | 3 |
| Zsuzsi | English | bilingual | 19 | 96 | 100 |
| Doris | English | bilingual | 20 | 40 | 47 |
| Pál | English | bilingual | 20 | 0.5 | 96 |
| Tim | English | bilingual | 21 | 4 | 13 |
| Ku | Vietnamese | monolingual | 22 | 34 | 93 |
| Szilvia | Slovak | monolingual | 22 | 73 | 63 |
| Zorán | Croatian | monolingual | 23 | 29 | 0 |
| Laurent | French | bilingual | 25 | 20 | 3 |
| Lóri | Serbian | monolingual | 28 | 3 | 3 |
| Ati | English | bilingual | 30 | 15 | 30 |
| Irina | Russian | bilingual | 30 | 6 | 0 |
| Janic | Croatian | monolingual | 30 | 2 | 3 |
| Antonio | Italian | monolingual | 32 | 0 | 80 |
| Kriszta | Serbian | monolingual | 38 | 7 | 0 |
| Mihály | English | bilingual | 38 | 62 | 80 |
| Ildikó | Slovak | monolingual | 40 | 5 | 0 |
| Nadeshda | Russian | bilingual | 43 | 5 | 20 |
| Galina | Russian | bilingual | 45 | 33 | 40 |
| Christa | German | bilingual | 45 | 98 | 100 |

The reason might be the simple fact that the stimulus words were given in Hungarian, which had a control over the language used throughout the testing time in the WAT, whereas they had no stimulus words in Hungarian apart from the introduction of the task when they were instructed to name the presented colours.

On the other hand, there were 16 subjects who did not switch at all in either of the tests though 9 of them were in the bilingual language mode.

## 4. Conclusions

Language mode determined the subjects' language behaviour in such a way that they did not switch in the monolingual mode except in some cases (and some subjects only) when they were talking about linguistic entities not existing in Hungarian. The majority of code-switches occurred in the bilingual mode even though there were subjects in this mode who did not switch at all. The base language determined the language of the interviews, and the subjects seemed to have a stronger control over their languages during the interviews than during the other two tests. They might have felt more strongly that they were being investigated. The less natural circumstances made a strong influence upon their language behaviour. On the other hand, in the colour naming and word association tests, they wanted to meet the expectations and did not make so much effort to control their language use.

In the colour naming test only half of the subjects switched codes. Out of the 20 subjects who switched to the other language, 10 were in a bilingual and 10 in a monolingual language mode. The ones in the bilingual mode could have been expected to switch between their languages but they did not do so. For them the base language of the experiment, which was Hungarian, must have been a determining factor in the choice of language. On the other hand, the subjects who used the other language did so in spite of being asked in Hungarian. They might have wanted to prove that they knew their other language, too.

With respect to the sex-related differences in the colour lexicon of bilinguals, it can be assumed that the differences are not significant and are based on experiential and cultural factors rather than on biological ones. A linguistic code for a colour, the colour word is linked with a physical code for the colour, the perceptual representation. According to Rosch (1975a,b), when a particular colour is presented to an individual, he or she generates or accesses the mental representation of the colour from his or her colour space. The findings that women are better at naming elaborate colour terms suggest the possibility that a woman's colour lexicon contains not only more linguistic labels than that of a man, but also a larger number of internal representations or physical codes. Nowaczyk (1982) found bigger differences between the sexes in his study conducted among monolinguals. Here, the differences are not significant which might be due to the subjects being bilingual and bicultural. The importance of culture in the reflection of the outside world projected in our internal representation has been justified.

The analysis of the word association test has shown that besides culture, the manner of language acquisition is also important in the internalisation of the world. Bilinguals store the information in a more complex way than monolinguals do. The outcome of the lexical access is largely dependant on the way the language was acquired. Most links turned out to be semantically based, which also underlines the importance of the common semantic representational form.

It must be concluded that language, speech, or behaviour, is not the basis of thought and that the language system *per se* does not provide the specifics of one's view of nature and culture. A semantic component can be universal because it is part of people's normal cognitive make-up, such as the human ability to perceive shapes and colours. We dissect the universe along lines laid down by nature and by our communicative and cognitive needs, rather then by our language. The meanings of linguistic items can be adjusted to our needs by metaphorical extensions (Hudson 1986).

Bilingualism is different from monolingualism in multiple ways not just because bilinguals know two languages but because the mental organization that underlies language and thought is different (Bialystok 1998). It is clear that experimental situations activate both languages in the bilingual. But to what extent these languages are activated depends on various factors. It was only recently that de Groot (1995), on the basis of an extensive review of the literature, came to the conclusion that **the** bilingual memory does not exist. However, as it was seen in the tests, fluent bilinguals can sometimes use conceptual representations that are shared across their two languages. The memory of every individual is likely to contain structures of various types and these structures will occur in different proportions across bilinguals. This will depend on factors such as level of proficiency of the languages known, the characteristics of the words, the strategy used to learn them, the context in which the languages are used, the age at which a language was acquired.

Data analysed in this paper seem to support the claim that the language context may play an overwhelming role in the choice and use of language in experimental situations. The more anxiety the subjects have to overcome, the more they tend to use both of their languages for the sake of a better accomplishment. The less anxiety is present, the more conscious and careful language use can be observed. In an interview situation, they concentrate not only on the notions but also on the form, whereas in an experiment they are more concerned about delivering the message, expressing the semantic representation rather than caring about their actual language use or bothering about the ways of linguistic realisation of that semantic representation.

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# HUNGARIAN BOOKS ON LINGUISTICS

**Marianne Bakró-Nagy – Zoltán Bánréti – Katalin É. Kiss (eds): Újabb tanulmányok a strukturális magyar nyelvtan és a nyelvtörténet köréből. Kiefer Ferenc tiszteletére barátai és tanítványai [Recent papers on Hungarian structural grammar and historical linguistics. In honour of Ferenc Kiefer by his disciples and friends].** Budapest, Osiris Kiadó, 2001, 407 pp.

This collection of papers is a kind of sequel to *Strukturális magyar nyelvtan. 1. Mondattan, 2. Fonológia, 3. Morfológia* [A structural grammar of Hungarian. Vol. 1. Syntax, Vol. 2. Phonology, Vol. 3. Morphology], Budapest, Akadémiai Kiadó, 1992, 1994, 2000. The papers in the first three sections present continuations of, additions to, or improvements over, particular chapters in those three volumes, or else discuss problems of interface between syntax and morphology, syntax and phonology, syntax and semantics, or morphology and phonology. The fourth section contains papers on historical linguistics that are related to *Strukturális magyar nyelvtan* either because of their topics, or because of their formal/theoretical approach. The authors dedicate the papers to Ferenc Kiefer, the editor of *Strukturális magyar nyelvtan*, on the occasion of his seventieth birthday.

Contents: Introduction (György Szépe); [Syntax:] Demonstrative pronouns in Hungarian noun phrases: agreement or sharing? (Huba Bartos), On inflected infinitives (Katalin É. Kiss), An LFG approach to the inflectional morphology of Hungarian possessive DPs (Tibor Laczkó), The role of subjective vs. objective conjugation in the elliptability of object arguments (Enikő Németh T. – Károly Bibok), Multiple lexical selection and parallelism in backward ellipsis (Zoltán Bánréti), On sentences with direct vs. inverse scope (Mihály Bródy – Anna Szabolcsi), The syntax of aspect in Hungarian (Gábor Alberti), Interrelations of information structure, syntactic structure, and aspect in Hungarian: progressive and existential aspect (Márta Maleczki), Reflections on *egyet* 'take a (swim, walk, etc.)' (Kristóf Piñón), The psycholinguistics of preverbs (Csaba Pléh – Levente Zsolt Juhász); [Morphology:] From words to parts of speech (István Kenesei), Spelling errors or differences in morphological analysis? (László Elekfi), Criteria for morphological productivity (Mária Ladányi); [Phonology:] Exceptions in the Hungarian verbal paradigm (Péter Rebrus), Absolute phonological ungrammaticality (Miklós Törkenczy), Degemination (Péter Siptár), The IP in Hungarian and its splitting (László Varga), The prosody of scope (László Hunyadi), Physiological rhythm in phonology? (Ilona Kassai); [Historical linguistics:] The Hungarian preverb: a latecomer in this language? (László Honti), Once more on morpheme classes in Uralic (Péter Hajdú), Reflections on types of explanation: analysing a Syryenian sound change (Marianne Bakró-Nagy), From historical linguistics to a theory of linguistic change (József Herman).

**Csaba Pléh and Ágnes Lukács (eds): A magyar morfológia pszicholingvisztikája [Psycholinguistic studies on Hungarian morphology].** BIP-Osiris, Budapest, 2001, 166 pp.

The papers in this book deal with psycholinguistic aspects of some interesting phenomena in Hungarian morphology. The structures resulting from a linguistic analysis of words are part of speakers' linguistic knowledge, since they recognize the morphemes as parts of words and can use them productively. What exactly do they know about these structures, how do they use and acquire them? The studies in this book apply the methods of experimental psycholinguistics and, examining morphological processing in Hungarian, they address more general questions of cognitive science as well.

The first paper is concerned with the representation of multimorphemic words. Levente Juhász and Csaba Pléh deal with the question of holistic and analytic representation, using the lexical decision paradigm to test whether Hungarian polymorphemic words are decomposed in the course of processing. They emphasize the distinction between direct, primary access mechanisms that already reveal combinatorial errors and secondary, slower representational processes. Results reveal that speakers of Hungarian use both prefix and suffix stripping, and search in a larger lexicon of content words as well as in a smaller inventory of grammatical morphemes.

Orsolya Thuma and Csaba Pléh contrast modular and interactionist, sequential and parallel models of language processing using the technique of online processing of homonyms (either roots or inflected forms) in Hungarian. Their results show that although there are fast and local mechanisms in processing, their use is not completely automatic and is influenced by a number of linguistic factors. The findings also argue for a decompositional representation of morphologically complex words.

The paper by Dezső Németh explains how morphological and syntactic processes are to be distinguished in the study of individual differences in language processing: the capacity of the phonological loop component of working memory backs up both syntactic and morphological processing.

Natália Dankovics and Csaba Pléh rely upon the paradigm of morpheme restoration to examine top-down effects in morphological processing. With the masking of single syllables, they contrast sentences with part of the root and an inflectional suffix being masked. Although effects are stronger in roots, there is a restoration effect in inflectional suffixes as well. The results support the existence of top-down effects for morphological processing.

Ágnes Lukács deals with another representational question, testing the psychological reality of linguistic rules through regular and irregular patterns of Hungarian morphology. The paper shows how important the study of languages with a rich morphology can be in testing associative, rule-based or hybrid models of language.

The last paper by Ildikó Király, Mihály Racsmány, and Csaba Pléh gives an example of how morphological distinctions map onto fine cognitive distinctions through studies testing the acquisition of artificial spatial terms. Results show that easy acquisition of grammatical distinctions (at least those with a clear perceptual basis) does not end in the early sensitive periods of language acquisition, and that the category of GOAL developed in the preverbal period is an important engine of language acquisition.

**Péter Siptár (ed.): Szabálytalan fonológia. Segédkönyvek a nyelvészet tanulmányozásához V. [Irregular phonology. Textbooks in linguistics 5].** Budapest, Tinta Könyvkiadó, 2001, 123 pp.

The title of this book is a pun: *szabálytalan* means both 'irregular' and 'ruleless'. On the one hand, a textbook on theoretical phonology must be irregular, to say the least, if the most notable schools of twentieth-century phonology are either completely unmentioned in it (like classical generative phonology or lexical phonology) or mentioned only in passing (like autosegmental phonology). On the other hand, what is common in the theories of phonology that this book does discuss, i.e., structuralist phonology (and its predecessors), government phonology (and its recent offshoots), as well as optimality theory, is exactly that the notion of "phonological rule" does not figure in them, or at least not in the sense of ordered rule systems as in derivational theories. The inclusion of the first chapter—discussing, among others, work by Jan Baudouin de Courtenay, Nikolai Trubetzkoy, Leonard Bloomfield, and Roman Jakobson—signals (and encourages) a renewed interest in pre-generative insights in phonology. The second chapter introduces some recent versions of government phonology of the 'strict CV' type, including the basics of the author's own proposal called VC phonology. Finally, the third chapter is the first textbook account ever written in Hungarian on optimality theory, the single most influential theory of phonology of the present day.

Contents: 1. Structuralist phonology (Mihály Péter), 2. Syllable-less phonology (Péter Szigetvári), 3. Optimality theory (Péter Rebrus).

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Brockhaus, Wiebke 1995. Skeletal and suprasegmental structure within Government Phonology. In: Jacques Durand – Francis Katamba (eds): Frontiers in phonology: Atoms, structures, derivations. 180–221. Longman, Harlow.

Cole, Jennifer 1995. The cycle in phonology. In: Goldsmith (1995): 206–44.

Goldsmith, John A. (ed.) 1995. The handbook of phonological theory. Blackwell, Cambridge MA and Oxford.

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(1) (a) A sólymaid elszálltak
the falcon-gen-pl-2sg away-flew-3pl
'Your falcons have flown away.'

Examples can be referred to in the text as (1a), (1a–d), etc.

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# GUEST EDITOR'S NOTE

Looking back in the history of Hungarian phonetics, one fact stands out clearly: Hungarian scientists were either the very first in the world to do high quality research in the field—like Farkas Kempelen—or ones whose work fit in well with the new trends of the time, like those pioneers who did the first speech experiments in this country. The first landmark of institutional Hungarian phonetic research was the formation of a Phonetics Laboratory at the beginning of the 20th century. This laboratory belonged to what was called the Eastern Trade Academy and aimed at studying Hungarian speech and dialects as well as conducting experimental research for practical language teaching purposes. Unfortunately, no continuation of this laboratory can be traced after World War I. The Linguistics Institute of the Hungarian Academy of Sciences was founded in 1949 and included a Phonetics Department right from the beginning. The main activity of phonetics at that time focused on collecting and recording Hungarian dialects, and on theoretical and experimental study of the articulation characteristics of speech. Starting from the 60s acoustic phonetics became part of the investigations along with a large-scale development of the equipment of the department's laboratory. By the 80s a relatively modern, well-equipped laboratory served the researchers in their work in various fields of phonetics. Hungarian speech synthesis developments started at the end of the 70s. Following the nature of the history of Hungarian phonetics, not only theoretical and experimental research but also various applications started developing. Speech technology began to develop after 1970. Since that time the quality of speech research—both phonetics and speech technology—reached the international level and some of its results are even pioneering achievements of the field. The Hungarian equivalent of 'phonology' can be traced back to the 1840s with the meaning of 'phonetics'. Phonology developed in the 19th and 20th centuries sometimes closer to and sometimes farther away from phonetics, generally depending on the persons dealing with its problems. By the end of the 20th century—similarly to the international situation—phonology and phonetics seem to have come to support each other developing hand in hand in solving many common problems. During the past decade the main results that the field can be characterized by are as follows:

- Description of the articulatory patterns of all speech sounds in terms of palatography, labiography, and X-ray examinations
- Acoustic-phonetic description of all Hungarian speech sounds and sound combinations in syllable context
- Thorough analysis of the temporal factors of Hungarian speech (segmental duration and speech tempo)
- Language-specific theory and experimental results on the processes of speech perception
- Systematic analysis and modelling of the $F_0$-structure and stress realizations of Hungarian for speech synthesis
- Modern description of Hungarian phonology

Results of applied phonetics are used in various fields of practice (GOH hearing screening procedure using synthesised monosyllables, Hungarian text-to-speech synthesis used in telecommunication dialogue systems, and applied in medical therapy methods, GMP-diagnostics—phonetically based test-package for the evaluation of speech perception and comprehension processes of children, SMS-reading tool, etc.)

At present, Hungarian speech research has got two main trends. One of them focuses on the analysis of spontaneous speech while the other one deals with applied research and speech technology. Having explored the acoustic structures of the speech sounds occurring in isolated words, the characteristic melody patterns of sentences in isolation, and the basic patterns of speech perception, researchers have now turned to new issues concerning the nature of the segmental and suprasegmental levels in spontaneous speech. The most important ongoing investigations aim at analysing (i) the temporal structures of fluent speech, (ii) the intonation structures of texts and dialogues, (iii) the interface between phonology and phonetics, (iv) the types of disfluency patterns, and (v) problems of speech technology like speaker identification, automatic speech recognition, improvement of naturalness of synthetic speech.

Researchers of the field try to keep the quality of their work up to the international expectations. The editor's aim was to show the diversity of present-day Hungarian phonetics and the most up-to-date investigations. This volume provides an overview of the current results of phonetics and phonology as well as speech technology.

The paper entitled 'Temporal coding of voicing assimilation in speech production' by Mária Gósy opens the volume, demonstrating the interrelations of phonetics and phonology through an analysis of the temporal patterns in speech production that arise from one of the strongest phonological rules of Hungarian. This paper is followed by the description of the prosodic structure of Hungarian by Gábor Olaszy. László Varga's approach—as opposed to Olaszy's—is based on phonology while using acoustic-phonetic data to support the theory. The temporal structure of Hungarian is discussed in two papers. One of them, by Gábor Olaszy, deals with modelling the complex time structure of speech sounds in continuous speech while the other one, by Krisztina Menyhárt, discusses monolingual and bilingual children's articulation and speech tempo. The dissociation of speech production and speech perception is discussed by Mária Gósy, based on the author's experimental data, in the framework of current theories of language acquisition. Speech technology research is represented by two papers in this volume. The practical challenge of creating a Hungarian e-mail reader initiated Géza Németh and Csaba Zainkó's work to carry out a statistical text analysis of corpora in three languages aiming at confirming Zipf's law. The automatic phonetic transcription process as part of automatic speech recognition requires solving the problem of various language-specific phonological processes that characterise Hungarian pronunciation. The paper by Péter Mihajlik, Tibor Révész and Péter Tatai provides a possible solution in terms of a computerised algorithm. Turning back to phonology to finish with, the last paper of the volume, by Péter Siptár and Szilárd Szentgyörgyi, describes the behaviour of $H$-type segments in Hungarian both in terms of a rule-based derivational approach and within the framework of Optimality Theory.

*Mária Gósy*

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# TEMPORAL CODING OF VOICING ASSIMILATION IN SPEECH PRODUCTION

MÁRIA GÓSY

## Abstract

During speaking, the mental lexicon is accessed (i) to select the necessary words, and (ii) to retrieve their phonological and syntactic patterns. However, the nature of real-time activation of words and phonological rules is largely unknown. In Hungarian, voicing assimilation is a relatively strong phonological process prevailing both within and across words. While a lot is known about its phonological nature as well as its phonetic outcome, the temporal patterns of its implementation during speech production have not been analyzed yet. This paper deals with the temporal coding of voicing assimilation (i) in language acquisition, (ii) in spontaneous speech (of subjects of various ages), and (iii) in repetition tasks. Results show that (i) by the age of 4 Hungarian-speaking children acquire this phonological rule without mistakes, (ii) in spontaneous speech successful voicing assimilation depends on certain time limits partly depending also on the total temporal organization of speech coding, and (iii) without the higher-level semantic and syntactic organization of speech (shadowing task), subjects are not able to plan the encoding of voicing assimilation processes as securely as they do in spontaneous speech.

## 1. Introduction

In spontaneous speech, speakers transform their thoughts into various linguistic forms. The mechanism that makes this possible works at a very high speed. During speaking the mental lexicon gets activated in order to let the necessary words be found that are appropriate for the actual topic of verbal communication. The same mental lexicon is responsible for retrieving the phonological and syntactic patterns of these words. However, not much is known about the nature of real-time activation of words and phonological rules, particularly the so-called postlexical rules. Accessing words in speech production is a fast process with a generally accurate result from the lemma level to lexeme level, however, the underlying processes are very complex (Levelt 1989).

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### 1.1. The phonological rule of Hungarian voicing assimilation

Hungarian has a rule of voicing assimilation whereby obstruent clusters come to share the voiced/voiceless specification of their rightmost member (Siptár–Törkenczy 2000; cf. also Siptár–Szentgyörgyi, this volume, section **5**). Voicing assimilation is postlexical, it applies across word boundaries as well as within words and has two branches. (i) The first one occurs when a voiced consonant follows a voiceless one and (ii) the second when a voiceless consonant follows a voiced one. The direction of voicing assimilation is always regressive. Examples:

(1) (a) Within words:
*megteszi* '(he) does it'
[mɛ**kt**ɛsi], i.e., [g] → [k]
*fordításban* 'in translation'
[fordiːtaː**ʒb**ɔn], i.e., [ʃ] → [ʒ]

(b) Across words:
*A víz hideg.* 'The water is cold.'
[viː**s** **h**idɛg], i.e., [z] → [s]
*Ismered a fiút, boldog.* 'You know the boy, he is happy.'
[fijuː**d** **b**oldog], i.e., [t] → [d]

Though the phonetic and phonological description of these assimilation processes appears only at the beginning of the twentieth century in the Hungarian phonetic and phonological literature, they are first mentioned as early as in 1821 by József Kolmár who intended to transcribe the pronunciation of the Hungarian speech of his time (as the very first attempt to record pronunciation in writing). Kolmár's intention to mirror the actual pronunciation independently of the letters of a word was a great achievement at the time since in the 19th century even the differentiation of sounds and letters was not obvious for many linguists and phoneticians of the world. Kolmár's text consists of five sentences as indicated by the presence of four full stops, and the sentences contain 106 words. The voicing assimilation processes are marked in the text (by the appropriate letter) both within words and across word boundaries. What is particularly interesting is that though he retained the orthographical markers (punctuation) for delimiting sentences he also marked the voicing assimilations across sentence boundaries indicating the nature of fluent speech. Examples:

(2) (a) Within words:
*fokhatom* instead of the orthographic form *foghatom* 'I can hold'
*sorogban* instead of the orthographic form *sorokban* 'in lines'

(b) Across words:
*hoty sokan* instead of the orthographic form *hogy sokan* 'that many people'
*probáljug betűinket* instead of the orthographic form *próbáljuk betűinket* 'we try our letters'
*kevézs gondgya* instead of the orthographic form *kevés gondja* 'his few troubles'

What is even more remarkable in this "transcription" is that there are three mistakes concerning the rule of voicing assimilation. One occurs within a word while the two others occur across word boundaries where there is a lack of the necessary change of the obstruents:

(3) *támadhat* (according to rule: *támathat*) 'he may attack'
*mindent de* (according to rule: *mindend de*) 'everything but'
*tanúbizonság tétetik* (according to rule: *tanúbizonsák tétetik*) 'proof is given'

The question is whether these transcription mistakes are really mistakes in the sense that they violate the rules and are simple consequences of the strong effect of orthography on the transcriber. This explanation is supported by the fact that József Kolmár obviously modified a written text according to his internal knowledge of its pronunciation. There might be another explanation that because of some unknown reason he deliberately did not mark the voicing assimilation in the above cases. A hypothesized reason for that is putting an accent on one of the neighbouring words which might result in some pause between the words with the consequence of the elimination of the assimilation process. It is also possible that the first explanation, i.e., the "mistake", applies in the word-internal case while the second explanation applies in the two cases of the lack of voicing assimilation across words.

## 1.2. Encoding of voicing assimilation in speech production

During speaking no one pays conscious attention to observing the phonological rules of voicing assimilation, the speaker is not aware of this kind of operation. This can easily be accepted when assimilation applies within a word. However, many questions arise when the same rules apply across word boundaries in spontaneous speech. The first question concerns the frequency of the voicing assimilation process, that is, of its possible occurrences, in Hungarian. Statistical analysis was carried out on the basis of a corpus containing 4,039,318 words. Taking into consideration all cases where a word had a final consonant followed by a word starting with a consonant such that voicing assimilation was expected to apply, 47,702 cases were found. This means that voicing assimilation had to take place in 11.81% of all consonant–consonant clusters across words. However, there is a statistically significant difference between the two branches of voicing assimilation. Voiceless consonants followed by voiced consonants across words are a lot less frequent than voiced consonants followed by voiceless ones. The ratio of the former situation is 4.41% of all cases while that of the latter one is 7.4%. Counting only the cases of voicing assimilation, the ratio of 'voiceless+voiced' consonants is 37.36% while that of 'voiced+voiceless' consonants is 62.64% of all cases. The statistical facts mean that a Hungarian-speaking person is (i) quite frequently prompted to apply this phonological process and (ii) much more prepared to produce and to listen to the voicing assimilation process applied in the devoicing direction than that applied in the direction of voicing.

Analyzing spontaneous Hungarian it frequently occurs, however, that voicing assimilation does not take place across words independently of the speech tempo or of the individual articulation characteristics of the speaker. Similar evidence can be found in the phonetic transcription mistakes of Hungarians that frequently concern the voicing assimilation process. What is the explanation for this observation?

The activation of the mental lexicon consists of four levels of processing: the activation of lexical concepts, the selection of lemmas, the morphological and phonological encoding of a word in its prosodic context, and the phonetic encoding of the word. It can be hypothesized that pauses occurring between words in spontaneous speech might block the speaker's performance of the required phonological process. According to Levelt's model of speech production (1989), the problem might arise at the level of lexeme, concerning its phonological coding. We assume that the first word is activated and its phonological form would be ready at hand, but its phonological form cannot be finalized without the activation of the following word in cases of the processing of a postlexical phonological rule. For voicing assimilation this means that the last consonant of the first word should not be defined without the activation of the first consonant of the second word. The expecting phase of finalizing the structure of the first worde is simple: the voiced or the voiceless version of the same consonant should be activated: *hogy* vs. *hoty* (cf. Figure 1).

It is likely that the basic, non-inflectional phonological structure of a word has a strong activation in the mental lexicon while an alternating word form has a weaker activation. We assume that, depending on the time elapsing between the activation of the neighbouring lexemes, activation becomes either stronger or weaker for the first word with the consequence of the speaker selecting the final consonant appropriately to the given situation. If the time is too long between the two activations, as the second word is not yet ap-

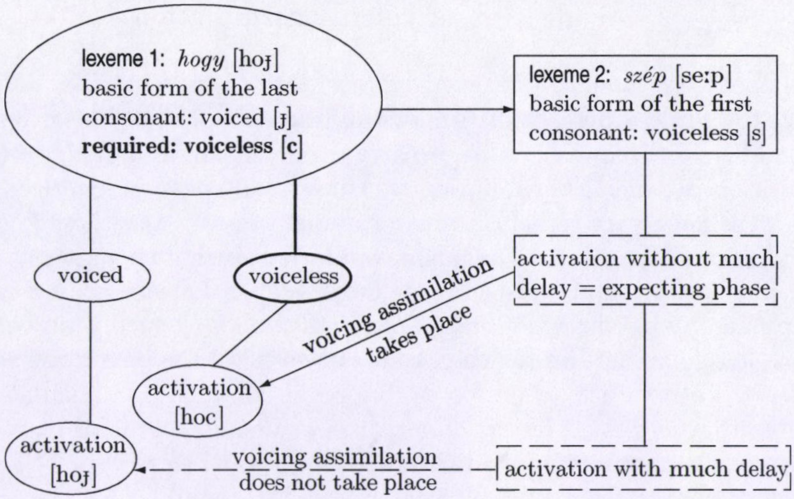


*Fig. 1*
Scheme of processing voicing assimilation as a factor of time

propriately activated, the speech production mechanism will select the usual phonological form while the other possibilities will be suppressed. In this case the required phonological process cannot be performed. In other words, our hypothesis is that the factor of time defines the operation of phonological coding across word boundaries. The importance of timing in the activation of phonological coding in another respect is shown by the fact that the speaker is able to retrieve the gender of a noun 40 ms earlier than he is able to define its phonological pattern (van Turennout et al. 1998). In our case the question is whether it is possible to define a time limit for a rule-based phonological encoding with respect to a postlexical phonological process. Is voicing assimilation predictable or else, are failures of this phonological rule a matter of mere coincidence?

In this paper we will look at data from acquisition, spontaneous speech production and perception, as well as speech production under controlled situations, to shed light on the influence of temporal factors on voicing assimilation.

## 2. Acquisition of voicing assimilation

In child phonology the term 'internal representation' characterizes underlying aspects of the child's perception/understanding and production of language-specific rules. No analysis has been carried out so far, however, concerning the acquisition of voicing assimilation by Hungarian-speaking children. Investigations were necessary to get an answer about the way and the age children retrieve the actual pattern of voicing assimilation during speaking.

The first meaningful words in language acquisition are picked up from the environment that provides morphologically, phonologically and phonetically ready-made structures for the child. However, in the beginning the child is not able to imitate the same forms due to his developing articulation gestures. Lexical access is a process of activation of single words in the phase of 'holophrases', so phonological coding narrows down to single word-like forms, and the language-specific phonological processes do not take place at this stage. Once the child's surface word forms are no longer embedded in a particular situation of use, they can be compared to adult-like forms providing a basis for the development of a generalized word production pattern. This can be the basis for the beginnings of phonological systematization and, furthermore, of the formation of phonological representation as part of internal representations (Vihman et al. 2001). When the child begins to create utterances of two or more words in the 'telegraphic speech' phase, word order is entirely dictated by semantics, while morphology and syntax are but partly applied. At that stage there are no phonological rules applying across word boundaries. There are frequently longer silent pauses between the words of such utterances representing characteristic temporal patterns of the child's lexical access during speech production.

By the age of about 2;5 this simple process gets more complex when increasingly complicated phonological, semantic and syntactic structures appear in the child's speech production. Since Hungarian is an agglutinating language with a very rich morphology, Hungarian-speaking children have to focus not only on the stems but also on the suffixes of nouns and verbs together with the required application of certain phonological processes within and across words. The child relatively quickly acquires both the meaning of the words and a relatively large set of frequently observed phonological and syntactic rules. This level of language acquisition provides an opportunity for the child to start applying phonological rules across word boundaries as well. However, the pauses between the words are still much longer than in adults' speech, therefore the realization of postlexical phonological processes presents a considerable difficulty for children. By the age of 3, children speak their mother tongue fluently, using the main types of rules of the language. The development of the application of voicing assimilation by Hungarian-speaking monolingual children was analyzed between the ages of 2 and 4. Two questions were to be answered within the frame of phonological acquisition: (i) What are the phases of the acquisition of voicing assimilation? and (ii) By what age is the child able to apply the assimilation process in question without mistakes and/or overgeneralization?

Four children's (two girls, two boys) systematically tape-recorded spontaneous speech (altogether 8.5 hours) was transcribed and analyzed. At the age of 2 all of them could pronounce two-word utterances and they showed a normal language development from this age onwards though their first language acquisition maintained some individual differences. The articulation of the voiced/voiceless consonant pairs, however, was correct with all children already at the age of 2, the differentiation could clearly be heard, and the acoustic consequences of articulation could be reliably analyzed. Three overlapping phases were differentiated during the period investigated (with some individual time differences among the children).

(i) In the first phase (between 2 and about 2;11) features are specified in children's mental lexicon but their utterances are frequently morphologically unordered. The perceptual system of the children enables them to identify sounds in various contexts but the lack of phonological manifestation results in a limited use of certain phonological rules. Children realize voicing assimilation within words but they are unable to perform it across word boundaries. They recall the items of the intended utterance from their mental lexicon as independent words, with only a serial connection between them. The fact that they use both forms of words with alternating stems shows their perfect perception and hence the basis for their developing abstraction of the rules. Children of the age of 2 can produce words like *ház* [haːz] 'house' with a final voiced dental fricative as opposed to *háztól* [haːstoːl] 'from the house' where the word *ház* has a voiceless dental fricative before the suffix *-tól*. The next step of their phonological development is to extract the voicing assimilation rule applying at morphological boundaries within single words. Both branches of voicing assimilation can be traced within words with all tested children.

(ii) The second phase begins at around 2;9 and lasts until the age of 3 with all children. This period is characterized by (a) the spreading of voicing assimilation to instances across word boundaries and (b) the overgeneralization of the rule both within and across words. Spreading means the realization of the rule as a postlexical one while the second feature means that the children apply the rule not only to the appropriate consonant clusters but also to pre-sonorant obstruents as well. Overgeneralization is successful in the sense that as its consequence voicing assimilation occurs also across words but unsuccessful in the sense that it is expanded to more consonants than is required in the language. Voicing assimilation is retrieved during their speech production with respect to all possible consonants that share the 'voiced' feature in the Hungarian consonant system. This means that the children are aware of the rule of this phonological process but still are not able to use it properly. Examples:

(4) (a) Within words:
*Krisztián* ⟨boy's name⟩
[gristijaːn] correct pronunciation: [kristijaːn]
*nagyuraknak* 'for noblemen'
[nɔɟurɔgnɔk] correct pronunciation: [nɔɟurɔknɔk]
(b) Across word boundaries:
*ügyes vagyok* 'I am clever'
[yɟɛʒ vɔɟok] correct pronunciation: [yɟɛʃ vɔɟok]
*nem is megyek* 'I do not go'
[nɛm iʒ mɛɟɛk] correct pronunciation: [nɛm iʃ mɛɟɛk]

The successful acquisition of the voicing assimilation rule presupposes the child's language awareness concerning the nature of voiced and voiceless consonants, and in the first phase this leads to overgeneralization. (There are some Hungarian dialects where voicing assimilation concerns all voiced consonants but the tested children did not speak those dialects.) Frequently, in the second phase the same utterance shows both the expected and the overgeneralized assimilation rules. Example:

(5) *egy pár zokni kell neki* 'he needs a pair of socks'
adult's production: [**ɛc pa**ːr zo**kni** kɛlː nɛki]
child's production: [**ɛc pa**ːr zo**gni** kɛlː nɛki]

(iii) The third phase occurs around the age of 3 and onwards. Children are able to use voicing assimilation according to language-specific requirements, their production performance shows an adult-like use of voicing assimilation in spontaneous speech. After the age of 4 no trace of overgeneralization of voicing assimilation could be found with any of the tested children. The duration of pauses between the words in children's narratives even at the age of 4 shows a wide range in time and depends on the child's individual speech production as well. The shortest pause that appeared between two words with a syntactic relation between them was 65 ms while the longest one was 2035 ms; the mean value of more than 450 measured pauses was 695.51 ms. Voicing assimilation took place across words despite long pauses (with the duration of 800 or 900 ms). Examples: *szoktung* [388 ms] *bemenni* (basic form: *szoktunk*), *mek* [833 ms] *homokozni* (basic form: *meg*) or, *ety* [568 ms] *kutyussal* (basic form: *egy*).

## 3. Assimilation in spontaneous speech

### 3.1. Voicing assimilation in spontaneous speech

Various experiments have been carried out in order to define the nature of Hungarian voicing assimilation in Hungarian spontaneous speech. Investigation of the acquisition of voicing assimilation rules confirmed that 4-year-old children's phonological awareness is well developed and works properly in fluent speech. Does this mean that children are able to retrieve phonological processes similarly to adults? An acoustic analysis of 8-year-olds' and 10-year-olds' speech indicated that their parameters specifically differ from those of adults: children who were most adult-like for one acoustic parameter often were not so for others (Smith–Kenney 1998). Beside the spontaneous speech of young adults also children's and old people's speech was analyzed. Phonetically trained students' transcriptions were used to obtain information about the decoding of voicing assimilation occurring in spontaneous speech. Finally, the shadowing technique was used in an experiment to observe the subjects' ability to retrieve voicing assimilation in this specific speech production task. The diverse approaches provided an opportunity to look at the temporal organization of the voicing assimilation process from the aspects of various speech production mechanisms and of perception.

#### 3.1.1. Method and material

5-hour samples of 4 Hungarian-speaking young adults' (ages between 24–36), 4-hour samples of 3 old Hungarian speakers' (ages between 65 and 75) and

3-hour samples of 4 children's (ages between 10 and 12) spontaneous speech was analyzed by means of Computerized Speech Lab type 4300B. Only silent durations were measured with reference to sound pressure waveforms and wideband spectrograms. There was no problem with segmentation of the words with any speaker. The shortest duration between two words that was taken into consideration was set to 20 ms while the longest was set to 1000 ms. Before the acoustic analysis, the recorded texts were transcribed (by a trained phonetician and controlled by the present author) using IPA symbols. More than 5000 possible places of voicing assimilation were found in the texts. There were about 1700 cases where a pause occurred between the adjacent words, and there were more than 600 places where the duration met our criteria and so they were worth measuring.

Means and standard deviations were calculated for the durations in all three age groups and also in the shadowing experiment. The statistical evaluation of the data was based on the ANOVA procedure that was carried out in SPSS for Windows 8.0 software package. In all cases confidence level was set at the conventional 95%.

### 3.1.2. Results

Silent pauses between two words had various durations in all age groups. The shortest pause was 20 ms with young adults, 25 ms with old adults and 35 ms with children in our material while the longest silent pause turned out to be 800 ms with young, 900 ms with old subjects and 970 ms with children (following our maximum 1000 ms criterion). Speakers retrieved voicing assimilation successfully in 71% of all possible cases in all three age groups collapsing across different pause conditions. In 61.25% of all cases of voicing assimilation there was no pause between the words, which resulted in a perfect activation of phonological coding. However, in 38.75% of all cases there were pauses of various durations between the words. Pauses either resulted in a lack of voicing assimilation (in 77.2% of these cases) or voicing assimilation occurred despite the pause (22.8%). In other words, if there is a pause between the words, voicing assimilation across word boundaries is uncertain. The duration of pauses strongly influences the activation of phonological coding. Pause duration is the primary definitive factor in performing voicing assimilation. The factor of age does have its own effect as well.

Data allowed us to define the range of pause duration between two words resulting in voicing assimilation in spontaneous speech. On the other hand, the range of pause duration that made it impossible to perform the phonological process could also be defined. Though there is some overlap among the data, temporal organization is proved to govern the process. The temporal organization of retrieving the phonological processes seems to be also dependent on age. In the case of young adults, if the pause between the words does not exceed 60 ms, voicing assimilation takes place. If the pause exceeds 350 ms, voicing assimilation does not apply. Between the two given values—60 ms and 350 ms—the speech production mechanism is either able to activate voicing assimilation rules together with selecting the words, or fails to do so. If the pause is longer than 350 ms, there is generally no more chance for the mechanism to "recover" the required phonological process. In the case of old subjects the shortest value is 120 ms while the longest is 600 while the children's data are 200 ms and 300 ms. Pauses of shorter or longer durations occur in all groups' data but sporadically. For example, a pause with the duration of 63 ms was found when one of the young subjects did not apply the required voicing assimilation while the phonological process took place despite the 492 ms pause between the two uttered words with another young subject. Table 1 summarizes the mean and standard deviation values for all age groups.

*Table 1*

Pause durations between words and their effect on voicing assimilation

| | DURATION OF PAUSE BETWEEN THE WORDS | | | |
|---|---|---|---|---|
| | VOICING ASSIMILATION APPLIES | | VOICING ASSIMILATION DOES NOT APPLY | |
| GROUPS | mean | std. dev. | mean | std. dev. |
| young subjects | 130.55 | 142.80 | 343.95 | 240.64 |
| old subjects | 318.30 | 239.89 | 502.17 | 307.52 |
| children | 192.57 | 236.93 | 462.07 | 285.30 |

There is a clear difference between young and old subjects' performances independently of whether voicing assimilation took place or not. The duration differences of pauses between these age groups show that old people's temporal organization seems to be slower and so they are able to retrieve phonological processes in cases when young people are not able to do so any more. Statistical analysis gives evidence for this statement: there are significant differences between young and old subjects in both cases: in performing and not performing the voicing assimilation in their speech ($p = 0.000$ and $p = 0.011$). The differences between suppressed and non-suppressed voicing assimilations are also significant both with young and old subjects ($p = 0.000$ and $p = 0.006$). This means that (i) there exists a time limit for successful retrieval of voicing assimilation for Hungarian-speaking adults; however, (ii) temporal organization varies depending on the age of the speakers (cf. Figure 2).

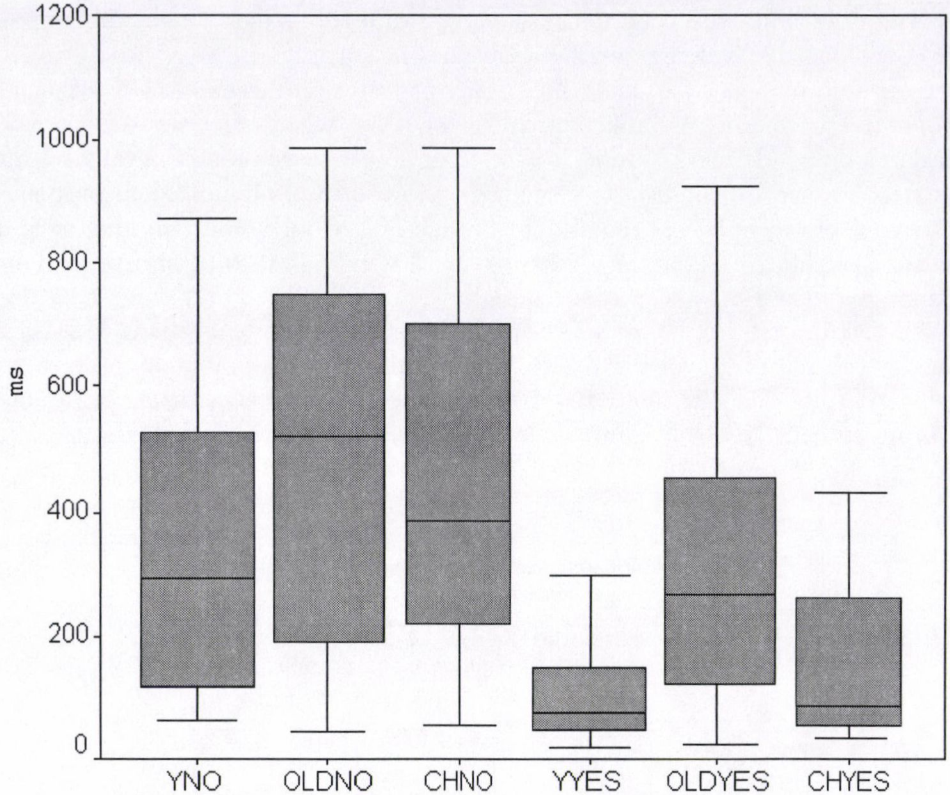


*Fig. 2*
Duration of pauses resulting in either successful voicing activation (indicated by "yes") or no voicing assimilation (indicated by "no") with all groups (y=young people, old=old people, ch=children)

Children's mean values fall between those of young subjects' and old subjects' data. Their mean values are closer to those of young people in performing voicing assimilation but closer to those of old people when not performing it. Statistical analysis revealed a more complex picture with children's production mechanism. There is a significant difference between the cases of existing and non-existing voicing assimilation also with children ($p = 0.000$). This means that at the tested age children's phonological encoding shows a time limit similarly to adults'. If we compare children's data to those of young adults, there is no significant difference between them in performing voicing assimilation in spontaneous speech. In other words, children behave like young adults in this respect. Concerning temporal organization this means that children's production mechanism works like that of young adults when encoding the phonological process of voicing assimilation. However, children significantly differ from young adults when they do not perform the required phonological process ($p = 0.028$). This means that the duration of pauses indicating the lack of voicing assimilation is strongly different between children and young adults. If we look at the data they show that young adults fail to encode voicing assimilation if the pause duration between two words exceeds 343.95 ms on average. Children fail to encode only in the case of a considerably longer pause duration (mean = 462.07 ms). Children's word activation takes longer in time than that of young adults. Does this mean that children behave more similarly to old adults? (There is evidence concerning the mental lexicon that children and old people are more alike, cf. Gósy 2000.) The present statistical analysis revealed that there is no significant difference between children and old people when they do not retrieve voicing assimilation depending on the values of pause duration ($p = 0.515$). However, children significantly differ from old people in performing the process according to the language-specific rules ($p = 0.027$). So, the answer to the question is a bit more complex in the case of phonological encoding. The data suggest that children are still developing the temporal patterns necessary for performing certain phonological processes. They are consciously aware of the processing of phonological encoding—as it could be seen from the age of 4—, however, the temporal organization of its actual processing differs from that of young adults.

The lack of voicing assimilation can be classified into four categories independently of age according to the motivation of the occurrence of pauses with longer durations (Gósy 1999). These pauses are found (i) before or after a conjunction, (ii) in cases of problems with lexical access, (iii) in the case of false syntactic structure and (iv) in cases of greater semantic shift between the two parts of the utterance. The conjunction frequently introduces a totally new string of thoughts, so the speaker needs time for macro- and microplanning which blocks the phonological coding. E.g.: "*I have been told ... but I considered that...*". Problems with lexical access might have multiple reasons. Searching takes time and this leads to the lack of voicing assimilation. E.g.: "*There were two ... secondary grammar schools.*" (The speaker wanted to be very proper in defining the actual type of school.) Spontaneous speech frequently contains references to known information that had been told previously. However, the structures of these references might not be very proper and a pause can occur while speaking. E.g.: "*of course this thing ... though I cannot give any evidence.*" The intended sentence was presumably as follows: "*Of course this thing is impossible though I cannot give any evidence to support my opinion*" (the speaker's lack of evidence was an information that had been told previously to the listener). The pauses of these cases are very useful for the listener since they provide time for him to rethink what he had heard in order to conceptualize the actual text (cf. Gósy 2001).

### 3.2. Transcription experiment

#### 3.2.1. Method and material

A 20-minute long spontaneous speech produced by three Hungarian native speakers (females) had to be transcribed without any pressure of time. The transcribers were 10 undergraduate (mean age: 21) and 10 PhD students (mean age: 28) of the Eötvös Loránd University of Budapest (monolingual Hungarians) after having taken a phonetic course. They had to use IPA-symbols. Markings of voicing assimilations were compared to the objective spectrographic analysis of the text.

#### 3.2.2. Results

The transcribers' own language awareness concerning voicing assimilation influenced their perception a great deal. Two types of mistakes could be found with the transcription of the target phonological process. (i) Marking of voicing assimilation where there was no actual interaction between the final consonant of the first word and the first consonant of the second word. (ii) Lack of marking of voicing assimilation. The occurrence of the latter type of mistakes was low, around 3% of all mistaken markings. All of the students, however, made the first type of mistake: they coded the voicing assimilation across word boundaries where there was actually a lack of this phonological coding in the heard text. The students' perception processes mirrored the heard sentences in their expected, normative forms obeying the necessary phonological rules. (There was no significant difference between the undergraduate students' and the PhD students' performances.) Since voicing assimilation seems to be a strong phonological rule in speech production and also in speech perception, listeners might have the sensation of perceiving the expected consonants in the sound combination instead of the really produced ones. Analysis of the students' mistakes shows that there is a strong correlation between the pauses of the two neighbouring words and the correct transcriptions of the voicing assimilations (r = 0.6). The longer the pause between the words the less the number of misperceived voicing assimilations (cf. Figure 3). If the pause between two words exceeded 600 ms, the students realized the lack of voicing assimilation in all cases, however, if the pause was less than 600 ms they could not transcribe the text properly. The proportion of the transcriptions' mistakes is 22.01% of all cases on average. However, if the pause between the two words was less than 100 ms the proportion of the mistakes increases to 53.9% of all cases.

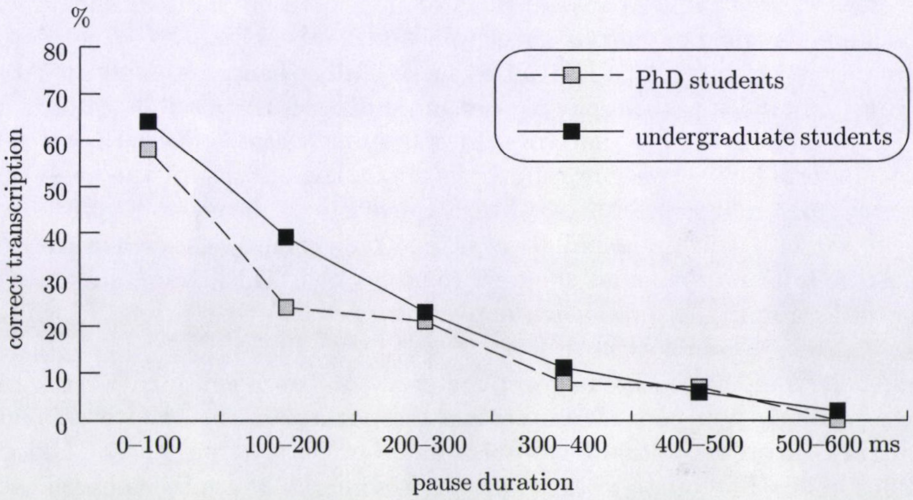


*Fig. 3*
Misperception of voicing assimilation by transcribers

## 4. Assimilation in controlled language

### 4.1. Method and material

A shadowing experiment was conducted involving 5 young adults (3 females, 2 males, ages between 19 and 22) where the subjects' own speech perception influenced their speech production. In these experiments, a 3-minute text was administered through headphones to the subjects who had to repeat what they (had) heard—or, expected to hear—immediately. Both the subjects' repetition and the original text were tape recorded. The original text was tape recorded by a female voice and contained 253 words and 32 places for voicing assimilation. The speech tempo of the heard text was 10.6 sounds/s in general. The subjects had no problem with shadowing. This method was first introduced by Chistovich and her colleagues (1965) to show the nature of the listener's 'inner speech' in order to support the motor theory of speech perception. People who are good at shadowing can repeat back speech with a delay of little more than 250–275 ms (cf. Aitchison 1987).

## 4.2. Results

The data show that (i) pauses are rarer in repetition than in spontaneous speech and (ii) in spontaneous speech the speaker is able to "recover" voicing assimilation in spite of pauses more successfully than in a repetition task. Voicing assimilation took place only in 11.1% of all possible cases which is significantly less than that in subjects' spontaneous speech ($p = 0.000$). This supports our activation hypothesis about the priority of the basic (non-inflected) phonological form of words. Surprisingly, however, subjects were able to retrieve voicing assimilation in relatively many cases when they had almost no information about the forthcoming word. This, again, supports our hypothesis about the alternative activation of words that might go through the postlexical phonological process of voicing assimilation.

Analysis of the repeated speech material confirmed again that retrieval of voicing assimilation depends on certain temporal patterns. However, pauses occurring during repetition have got a different nature from those of spontaneous speech. The origin of these pauses is some kind of mis-synchronization of the heard text, i.e., the speaker's production mechanism is in an expecting phase, generally without any idea what comes next. (If—on the basis of semantic/syntactic context—they are able to figure out the following items, there is practically no pause between the two words.) The duration of pauses was much shorter in repetition than in spontaneous speech (for the latter only the young subjects' materials were considered). The "synchronization delay" is characteristic of the speakers; however, there were no great differences among our subjects. Similarly enough, all speakers started repeating the heard text with a delay of 580 ms on average. The shortest measured delay was 400 ms while the longest one was 940 ms.

Pauses subjects took between words were different; however, they behaved temporally alike in performing postlexical voicing assimilation. Voicing assimilation took place with all subjects when the pause between two words did not exceed 17.8 ms on average. If the pause was longer than this duration, the word would be activated from the mental lexicon in its stored form without any postlexical phonological alteration. There is no overlap between the durations of pauses depending on existing voicing assimilation as opposed to the findings in spontaneous speech. If the speaker has no idea about the forthcoming word for about 18 ms the mechanism automatically selects the original phonological form of the word. There is no expecting phase in shadowing speech. Table 2 shows the duration of pauses that occurred between pairs of words with various speakers. There are no significant differences in pause durations between the speakers S1 and S2 ($p = 0.071$), S2 and S3 ($p = 0.792$), S4 and S5 ($p = 0.117$), and S1 and S3 ($p = 0.144$) while there are significant differences between S3 and S4 ($p = 0.002$), S1 and S5 ($p = 0.000$), S2 and S4 ($p = 0.002$), as well as S1 and S4 ($p = 0.002$). Pause durations in shadowing are significantly different from those appearing in spontaneous speech (cf. Figure 4, overleaf). Independently of the actual values of pause duration the individual speakers required almost the same time for retrieving voicing assimilation in the shadowing task.

*Table 2*

Duration of pauses between words in shadowing speech and the time limit for voicing assimilation

| | DURATION OF PAUSES BETWEEN ADJACENT WORDS | | |
|---|---|---|---|
| SUBJECTS | mean | std. dev. | duration limit for VA |
| S1 (female) | 29.66 | 29.24 | 17 |
| S2 (female) | 44.66 | 16.32 | 15 |
| S3 (male) | 46.60 | 20.43 | 18 |
| S4 (female) | 152.40 | 108.61 | 19 |
| S5 (male) | 227.33 | 139.22 | 20 |

Speakers could follow the syntactic structures of the heard text more easily as opposed to the semantics of the sentences. Voicing assimilation was performed more successfully in those places where syntactic structure could be predicted in advance.

## 5. Discussion

The following conclusion can be drawn for the temporal organization of phonological coding in spontaneous speech production. Postlexical phonological coding can be performed for some time after the first word having been selected from the mental lexicon. This period of time is strongly influenced by the speaker's age. Both phonological forms of the selected word are

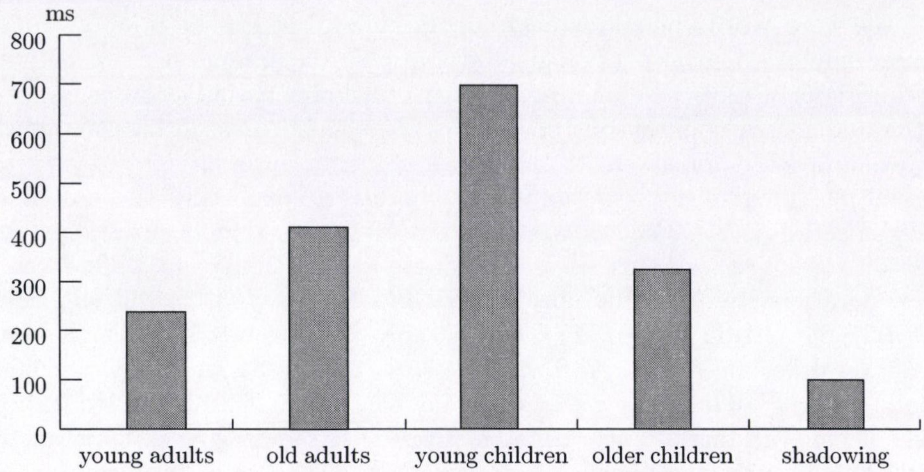


*Fig. 4*
Mean duration of pauses between two words across groups

activated during the phase of expecting the next word (both the final voiced and voiceless consonants). If the mechanism is too slow to select the next word the "activation weight" of the basic (non-inflected) phonological form of the word increases and the alternative activation decreases. This will result in failing to process the postlexical voicing assimilation. If the production mechanism should work (for experimental purposes) without transformations from thoughts to speaking the time structure of the expecting phase narrows down enormously (18 ms as opposed to 130 ms on average). Levelt (1989) assumes that the speaker's time possibility for microplanning (including phonological processing) is about 300 ms. If microplanning exceeds this period of time, the postlexical phonological processes, like voicing assimilation, will not be accomplished. Our findings have practically supported this assumption though longer periods were also found, particularly with old people and children. The question might arise how old people's and children's phonological retrieval could provide more time for them than it is the case with young people. The explanation for that might differ in children and in old subjects. It can be assumed that the activation weight of alternating phonological forms of words in the case of children does not show great difference simply because of their inexperience in speaking. This explanation, however, should not be applied to old people. Old speakers' reaction times are longer than those of the younger ones. It can be hypothesized that their speech production mechanism is gradually modified toward a slower processing (independently of their actual speech tempo).

Results demonstrated that voicing assimilation as a postlexical phonological process is (i) a factor of development, (ii) dependent on specific temporal organization that governs phonological coding, and (iii) is predictable when precompiled syntactic structures are available.

Findings of these experiments also touch upon the question of the organization of the mental lexicon. On the basis of the present experimental data, the double storing of some lexical units is assumed. It is well known that segments can show an (optional) mutual influence being exercised across word boundaries in assimilations (Laver 1994, 376). However, if it is a phonological rule, the mental lexicon is assumed to be concerned. Therefore, it can be supposed that morphemes having a final voiced or voiceless obstruent that can be the first member of a consonant cluster might have two forms stored, one with the usual voiced or voiceless final consonant and another one with the counterpart of the "basic" obstruent. E.g.: *kalap* 'hat' |kɔlɔp| vs. |kɔlɔb| or *és* 'and' |eːʃ| vs. |eːʒ|. This strategy of storing might apply also to suffixes like *-k* 'Plural' |-k| vs. |-g| or *-t* 'Accusative' |-t| vs. |-d|. Results of children's phonological acquisition process show that the double storing is characteristic of a certain phase of development when children use both their own phonological forms of words and those of adults' sharing the same meaning. Children's perception depends on either stored form. Later on, the same strategy will be used to identify words of alternating stems (like |kɔlɔp| vs. |kɔlɔb| 'hat'). By the age of conscious phonological awareness, phonological coding approaches the adults' mechanism as it could be seen with our child subjects.

Hungarian postlexical voicing assimilation results in consonants at the margins of neighbouring words being more similar to each other, by the phonetic identity of one consonant (the final one in the first word) being subordinated to that of another (the first consonant in the second word). The rule applies to a defined set of consonants in the language. By the age of 3 children also acquire the postlexical phonological process but the temporal organization of their processing differs from that of experienced speakers even at the age of 11. Temporal organization governs phonological processing, and the experimental data revealed the actual values existing in the production mechanism.

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# THE MOST IMPORTANT PROSODIC PATTERNS OF HUNGARIAN*

GÁBOR OLASZY


## Abstract

Prosody is a general term for the following features in speech: pitch and intonation, stress, articulation rate, sound intensity and time structure (rhythm and pauses). During verbal communication various prosodic forms contribute to the expression of the content of the message (the information carried by the text, emotional expression, to imitate a situation etc.). So, prosody can be represented as a multivariable function in which the number of variables is rather high. Therefore it is difficult to describe the complex process for all situations, meanings, and emotions. In this paper we try to give a phonetic level characterization of pitch and intonation structure and also the function of intensity in time of the main Hungarian sentence types (using a unified description). The manner of description is new concerning Hungarian. It is based on a unified relative scale in which not physical values but relative distances in pitch values and intensity are used to characterize the melody forms and the intensity levels. This description allows for the representation of these two prosodic elements independently of the personal features (mean $F_0$ value, the range of the $F_0$ of the speaker, etc.). The representation makes it possible to express the crossfunctions among the melody forms of different expressions. This means that complete prosodic patterns can be predicted for any text without an acoustic analysis.


## 1. Introduction

Examination of the prosodic structure (mainly intonation patterns) of continuous speech has become more and more important in the last decade while the fields of applications of automatic speech generation have grown drastically due to the industrialization of information technology. In these applications increasingly better speech quality is needed in text reading (continuous news reader, e-mail reading, various talking services like book reviews, weather forecast, prose reading, etc.), and also in services where automatic dialogues are realized between the machine and the client. A number of models have been constructed in the last decade to describe the inherent structure of intonation—e.g., for Dutch (Collier 1990; Terken–Collier 1990) for German

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(Möbius 1997); for Japanese (Fujisaki 1992); for English (Silverman et al. 1992; Taylor 1998; 2000). Also, the research on "emotional synthesis" seems to be increasingly important in constructing life-like verbal situations between humans and machines (Montero et al. 1999). The detailed, phonetic level modelling of the prosody of Hungarian, verified by speech synthesis experiments, has been completed recently (Olaszy 2000; Olaszy–Koutny 2001).

In earlier works on Hungarian, mainly melody patterns were studied. The first systematic investigation was performed by Fónagy and Magdics (1967). They examined the melody form of a few hundred sentences by ear, and the description of the melody was presented as a series of musical notes in a five-line system. This description gave only some general information about the melody patterns of Hungarian. Later works (Olaszy 1989; Varga 1993) also examined intonation from various points of view. Varga described a phonological assumption about Hungarian sentence melody forms. He represented the melody forms by schematic lines which were drawn between two theoretical horizontal lines representing the highest and the lowest $F_0$ values of the speaker. The first perceptual measurements on the melody forms of statements, questions, commands and exclamations were done by Gósy (1992). She used special audio material in which only the fundamental frequency of real speech was present, the higher frequency components were eliminated. These speech stimuli were produced by a special $F_0$ imitator device for which the input was real speech and the output was the melody in audible form (i.e., test subjects did not hear the content of the recorded utterance, only its melody form).

The goal of the present research was to define the most important components of Hungarian prosody. Another goal was to construct a generalized manner of description. A unified relative $F_0$ and intensity scale has been defined in which not physical values but distance values are used to characterize the melody forms and the intensity levels.

## 2. Material and method

The speech material for this research contained 800 sentences, mainly statements, questions, commands, warnings and requests. The sentence structures were also diverse, ranging from simple one-word sentences to longer ones up to complex, long sentences and even short dialogues containing 2–3 sentences. The text material was read by a male speaker (a 58-year-old trained speaker, born in Budapest, speaking everyday Hungarian) digitized with 22kHz, 16 bit, labelled by pitch period markers, as well as sound and word boundary signs, by a semiautomatic Hungarian software (Olaszy et al. 2001). The average articulation rate of the speaker was 13 sounds/s.

As to the method of melody and intensity curve representation, a generalized manner of description was used. The melody and intensity patterns are described with stylized straight lines in a relative scale. The same reference level is defined for all sentence types. By applying a relative scale the definition of a reference level is arbitrary. Most of the earlier authors take the speaker's sentence final pitch value as the low reference. In what is called the superposition model (Fujisaki 1992), the linguistic pitch contour is treated as if it were some sort of complex function which can be decomposed into simpler component functions (e.g., accent on a prominent word) and overlaid or superimposed on global shapes (e.g., the distinction between a statement and a question). In Fujisaki's model a low reference $F_0$ value (speaker specific) represents the fundamental point for the superposition of the phrase component and the accent component. The pitch values are then expressed by distance functions from the reference level. This approach is based on the experience that in declarative sentences the dispersion of the final (lowest) $F_0$ values of the speaker is relatively small, about 3% (Möbius 1997). Ladd (1996) compares this model to the 'target and transition' models which are based on the ToBi idea (Silverman et al. 1992). He thinks the advantage of a phonological (target and transition) model of intonation is that speaker pitch becomes a relatively low-level realization parameter. In a superposition model, it is difficult to distinguish language-specific or universal aspects of intonation from speaker specific features of pitch range.

In the present work, basically the idea of the superposition model was used. The difference is that sentence structure was taken into consideration when defining the reference level (Olaszy 2000). Another difference is that the same description philosophy is applied to $F_0$ and to intensity. Given that, of all sentence types, it is statements that occur the most frequently in speech, the reference level for the $F_0$ calculation was decided to be the initial pitch and intensity values of the simple declarative sentence (the reference value is 1, i.e., 100%). By this solution the relative differences among sentence types as a function of declarative sentences show a clearer structure than in the earlier methods. We think that the initial part of the sentence has the main role—as to the general shape—in speaking. The modality of the sentence in Hungarian can be predicted already from the initial part of the sentence. Therefore, it is appropriate to define the initial $F_0$ points of all sentence types as a function of the declarative sentence. The sentence final parts have been defined as a function of the ending of declaratives. Another advantage of this method is that the rules for transforming the $F_0$ patterns from one modality to another (i.e., to generate a question, or a request, or a command from a statement) also show clearer structure, because the reference value is attached to a real sentence mode. The main melody structure of all sentence types is described in the same scale. The reference for intensity is defined similarly. The reference level (0 dB) is the beginning point of the declarative sentence. The above representation is independent of personal features (mean $F_0$ value, the range of the $F_0$ of the speaker, etc.). Applying the generalized stylized patterns, complete Hungarian prosody patterns (for longer texts, dialogues, etc.) can be predicted if the person-dependent reference $F_0$ is given, e.g., $100\% = 125$ Hz.

Three levels of pitch changes have been used to describe pitch structure: the phrase level main melody contour as a carrier item and the word and syllable level modifications as local $F_0$ movements that are superimposed on this main contour. A sentence can be made up of one or more intonation phrases. Local $F_0$ changes may occur within the intonation phrases mostly in relation to accentuation and boundary marking. Word level modifications represent those text parts in which the $F_0$ change is characteristic of the whole word. For example, articles and conjunctions are treated as unaccented words in which the $F_0$ is lower within the whole word than in the main contour. The syllable level $F_0$ changes represent mostly positive modifications in the main melody form (accented syllables and positive $F_0$ changes in boundary marking or in questions). In Hungarian, the accent is placed invariably on the first syllable of the word. In this description we use two levels to characterize the status of the syllable: syllable with positive $F_0$ change (accented or marking boundary, etc.) and neutral. The neutral status belongs to those syllables in which the $F_0$ is the same as in the phrase level pattern. The pitch changes in general are stylized, with three major contour types: falling, level and rising.

The slope of falling or rising depends on the one hand on the duration of the time interval where the contour is present, and on the other hand on the minimal and maximal frequency values of the frequency band in which the fall or rise movement is realized. The combination of these two factors may determine several exact melody contours as building elements of the final melody.

## 3. The unified melody and intensity representation

Both the $F_0$ and the intensity structure of the analyzed sentence types will be described in a unified scale with stylized lines. For the $F_0$ changes the phrase level main pitch contour is given with its beginning and end points as a carrier element. The word and syllable level additional changes are given under this scale in the word (W) and syllable (S) lines as multiplication factors to modulate the main contour (similarly to Fujusaki's representation). The value of the multiplication factors may vary between 0.5 and 1.5. The modulation is calculated from the $F_0$ values of the main pitch contour. Thus a range reduction is realized as well. The stylized contours on the figures below show the main, phrase level shape (thin line) and the local changes (thick line). The local changes overwrite the thin lines, i.e., they are valid for the final $F_0$ contour. The description of intensity structure follows the same philosophy.

### 3.1. Statements

The phrase level main melody form for statements (Figure 1, overleaf) is a continuously falling pattern. If the sentence is short, the original $F_0$ pattern and the stylized one are roughly the same. If the sentence is longer, word and syllable level pitch changes may modulate the falling melody form in positive or negative directions. The pitch curve of the sample sentence in Figure 2 (page 283) shows that unaccented words (articles) have lower $F_0$ values than their surroundings, whereas the accented syllables (marked with dots) have pitch peaks. Microintonation also modulates the pitch curve on the sound level (marked with downward pointing arrows in Figure 2), but these segmental level changes are not involved in the present description.

In statements the declination in pitch was found to range between 30% and 42%. The lowest $F_0$ endpoint was realized if the sentence was pronounced in isolation, or if it was the final one in the text. The shape of the intensity structure was similar to that of the pitch change; the range of the declination was between 15 and 20 dB along the whole sentence (Figure 2).

The lower $F_0$ value in unaccented words depends on their place within the sentence. The greatest difference compared to the main pattern can be measured if the sentence begins with such an element (see in Figure 2, marked with the upward pointing arrow). In this case the negative modification may reach the factor 0.8.

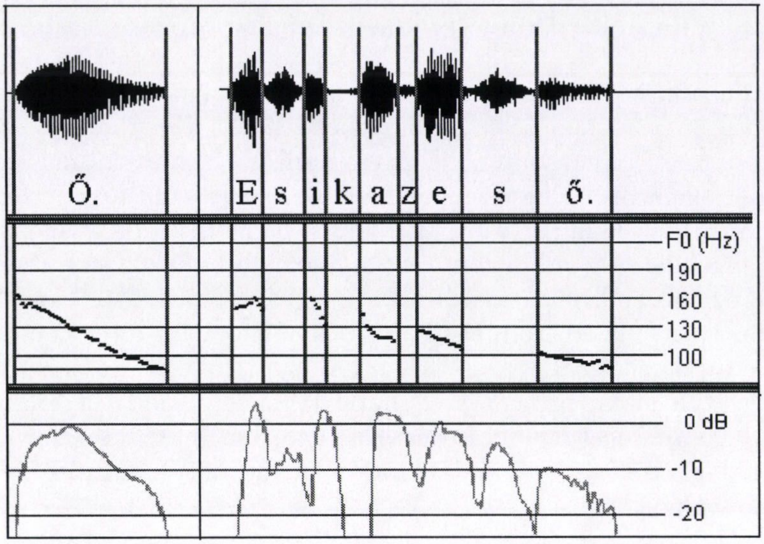
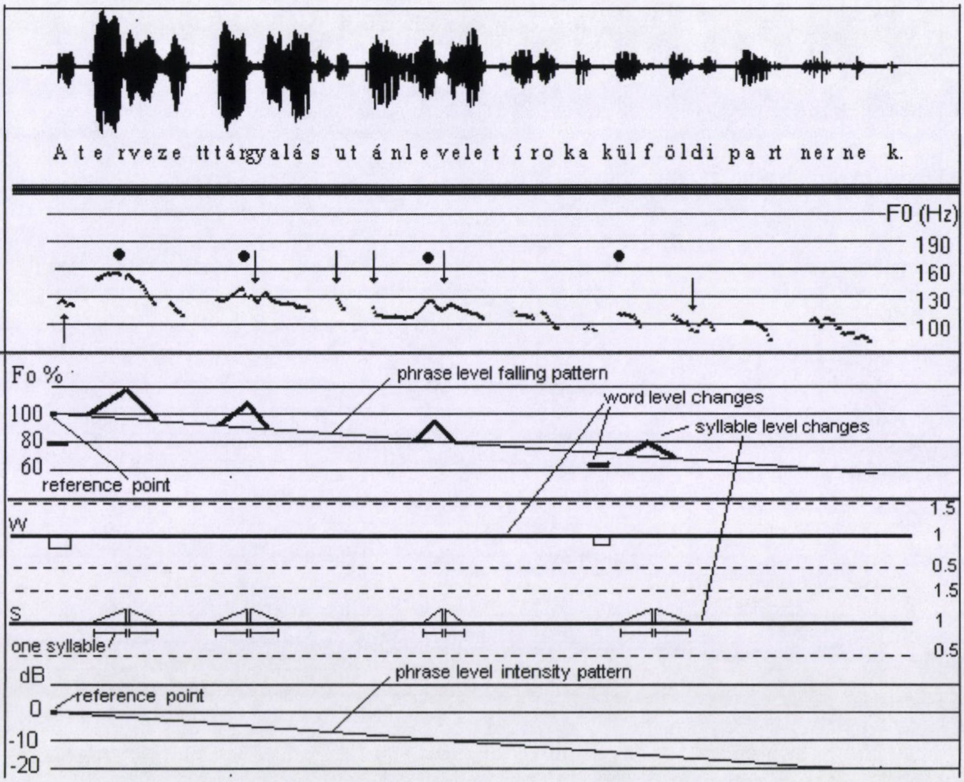



*Fig. 1*
The declination in pitch and intensity for two simple structure short statements (*Ő.* 'He/She.'; *Esik az eső.* 'It is raining.'). The vertical lines show sound boundaries

In the case of complex statements, several intonation phrases (falling patterns) make up the whole sentence. The initial $F_0$ value is at the reference point, the sentence final one is on the same value as it did in simple statements. The intermediate falling patterns show a sawtooth structure which itself also has a slight declination. An example is shown in Figure 3 on page 284. Commas separate the sentence into three main falling patterns. The comma effect is expressed both on word and on syllable level, i.e., the equalization of the falling $F_0$ into a level one is expressed by the word level modification, while the final rise may be expressed by the syllable level one. The result in the word before the comma will be similar to what can be seen in the natural $F_0$ pattern. In the second falling pattern two word-accents and one comma effect form additionally the main $F_0$ contour. The third, final falling pattern ends on 58% and contains two syllable level changes. The unaccented parts of the sentence (*hogy*; *a*; *aki már*) are marked with negative word level modifications. The accents show pitch maximums in the first syllable of the accented words (*azt*; *Péter*; *levelezik*; *három*; *külföldön*).

As to the intensity structure of complex declarative sentences (see the lowest part of Figure 3), the unaccented parts (marked with arrows) have a




b

*Fig. 2*

The $F_0$ structure (a) and the stylized representation (b) of a statement. (*A tervezett tárgyalás után levelet írok a külföldi partnernek.* 'After the planned discussion, I will write a letter to the foreign partner.')

lower intensity than their surroundings. The intensity level is close to 0 dB in the first two clauses, a declination to −20 dB is present only in the last one.

Summing up the main $F_0$ features of complex statements in Hungarian, it was found that in general the range of declination is about 40%, independently of the length of the sentence. The internal phrase level intonational parts have also falling $F_0$ structure (each). In very long sentences the slope of the declination in one intonation phrase can be so small that practically the $F_0$ structure shows a level form. The effect of comma represents a syllable level change into a rise or level form in the final part of the word before the

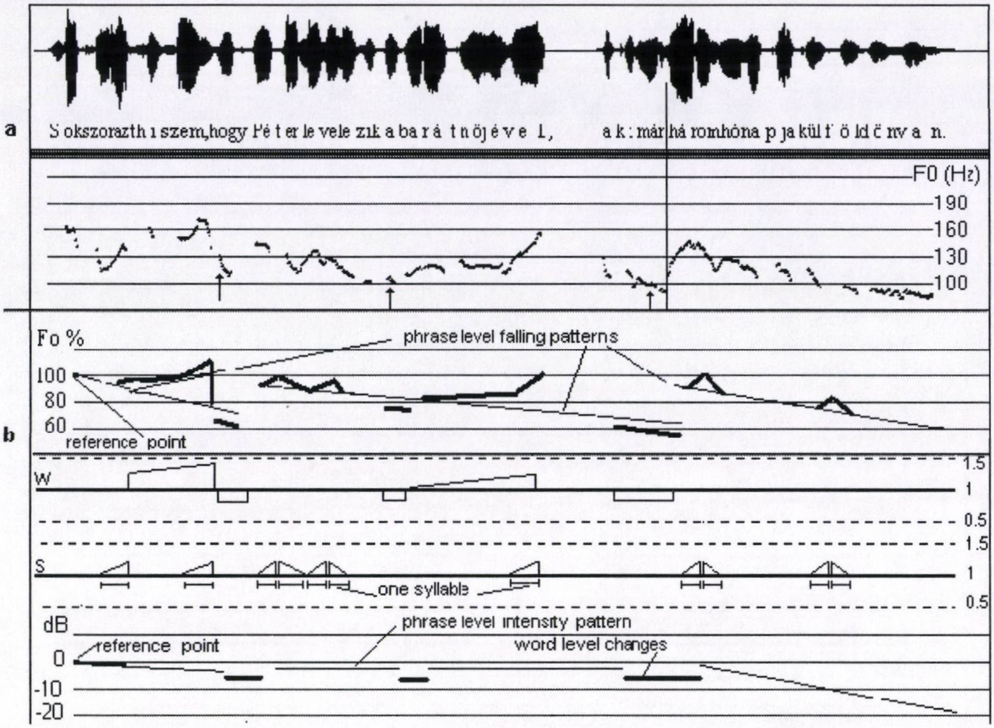



*Fig. 3*

The $F_0$ structure (a) of a complex statement and its stylized (b) representation. *Sokszor azt hiszem, hogy Péter levelezik a barátnőjével, aki már három hónapja külföldön van.* 'I often think that Peter is corresponding with his girlfriend, who has been staying abroad for three months now.'

comma. The unaccented elements have mostly lower $F_0$ values than their surroundings, whereas the accented syllables have higher values.

The final prosody realizations for statements may be influenced by the content of the text and also by the intention of the message. Different styles are used, for example, in news reading or in prose interpretation. A traffic information announcement has its special style as well. If names and addresses are read in an information system, their prosody also has special elements. All this means that in speech technology applications the exact prosodic structure of statements can be determined after a detailed study of the diverse texts and purposes of the application.

### 3.2. Questions

The melody patterns in Hungarian interrogative sentences vary to a large extent, depending on various features. Besides the two main categories (yes/no and *wh*-questions) there are other question types and subtypes with individual melody patterns. The melody forms in questions may also depend on the length of the question (one, two or more syllables), on the internal structure of the sentence and on the intention and emotion of the speaker. The intensity structure of certain questions shows different characteristics from those in statements, and in certain questions the sound durations are strongly lengthened.

#### 3.2.1. *Wh*-questions beginning with a Q-word

The minimal structure of this type of question is: Q-word + one word, e.g.:

(1) **Mikor** indultok?
'**When** will you start?'

The main $F_0$ structure for *wh*-questions is a falling pattern, which starts from a lower value (about 80%) and ends on a similar point as it did in statements, i.e., the slope of the falling pattern is flatter in these questions than in statements. This form is realized independently of the length of the question.

(2) (a) **Kivel** fogtok most találkozni?
'**Who** will you meet now?'

(b) **Mikor** írod meg a levelet az édesanyádnak?
'**When** will you write the letter to your mother?'

A syllable level $F_0$ modification in the Q-word realizes the question intonation; word level modifications do not occur. The syllable level high-low modification is as follows: the $F_0$ value is high in the first syllable (the peak may reach 130%) and is reduced in the second (Figure 4). The right proportion between the peak and the slope of the main falling pattern determines the proper intonation of the whole question. The higher the peak value and the lower the starting point of the main falling pattern the more characteristic the question will be. Other syllable level modifications (word accents) do not appear in the descending part.

There exists another variant for the pronunciation of these questions (Gósy 1993). The difference between the standard rendering (described above) and the variant is in the pronunciation of the final part, i.e., people may raise the $F_0$ in the last syllable. This rise is about 10% compared to the $F_0$ value of the last but one syllable. Another difference is that the main $F_0$ pattern is not falling but it shows a level character. It begins with a slightly lower $F_0$ frequency than in the standard version and this level is kept until the last syllable. This difference can be explained by the fact that the human prediction mechanism for $F_0$ generation decides the ending form of the question already after the pronunciation of the question word. If the decision is low ending (standard version), a descending part will be produced after the question word. If the decision is to rise up at the end, the same part will be changed into level form to prepare the way for the rise at the end.

The intensity structure of *wh*-questions shows very similar structure to what it was like in statements.

### 3.2.2. *Wh*-questions with a topic

If a *wh*-question has a topic part before the actual question, the melody structure can be represented by two phrase level patterns. The topic has a slightly rising form, whereas the question part is the same as described for simple *wh*-questions. The topic part before the question begins with a lower $F_0$ value (about 80%) and has a slowly rising (to 85–90%) character which prepares the way for the question (Figure 5, page 288).

### 3.2.3. Complex *wh*-questions

In complex forms the *wh*-question is followed by another clause.

(3) **Mikor** mész az üzletbe és veszed meg a kávét?
'**When** will you go to the shop and buy the coffee?'

In these cases the question part has similar characteristics as in the simple *wh*-questions, but the descending part will end higher. This higher ending can be explained by the fact that the sentence has not been finished at this point, it will be continued. In the additional part the descending $F_0$ change is continued until the very end of the complex sentence. The very final $F_0$ value is close to that in simple statements (60%). Word accents may occur in the additional clause.

If the complex *wh*-question contains more than one question word, one falling pattern is present over the complex question and the syllable level peaks in the Q-words will have consequently lower and lower $F_0$ values along the sentence, realizing the range reduction.

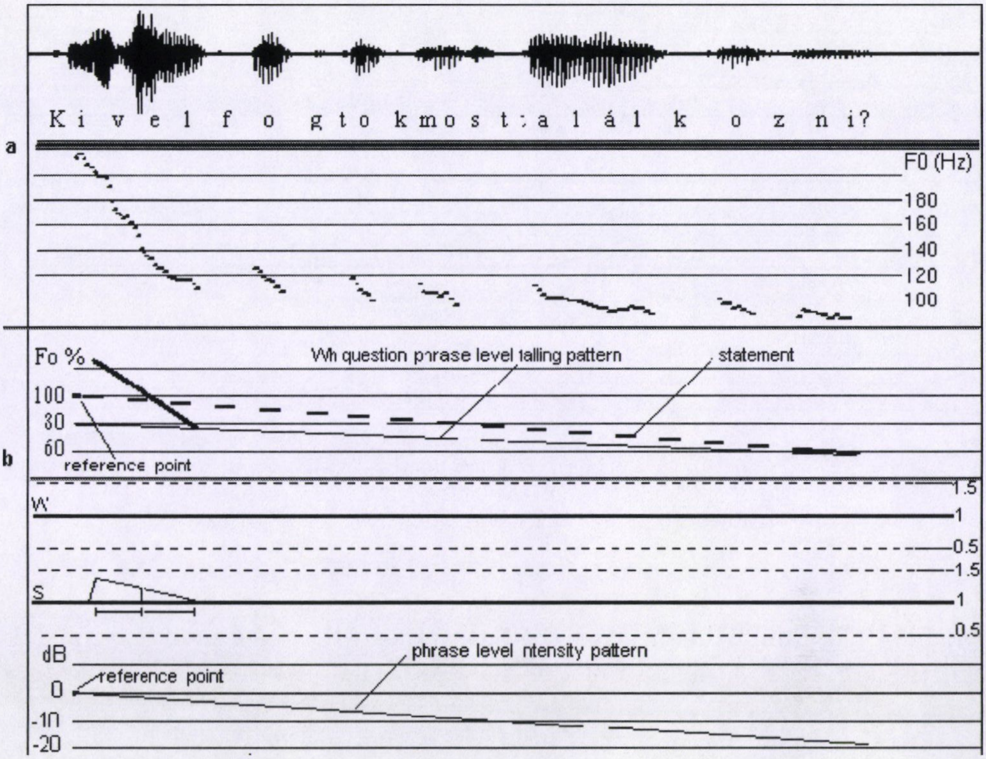



*Fig. 4*
The typical $F_0$ pattern of a *wh*-question longer than three syllables (a) and its stylized (b) representation

(4) **Mikor** fejezed be a munkát és **mikor** jössz haza?
'**When** will you finish work and **when** will you come home?'

### 3.2.4. Yes/no questions and their environment

The main intonation pattern of yes/no questions can be of a rise-fall or a level-fall form (Figure 6, page 289). If rise-fall is realized, the starting point is lower (80%) than in statements and the end of the rising part is about 100%. This rising structure prepares the way for the $F_0$ peak of the questioning part, which is placed at the beginning of the last but one syllable. In the second version, the level pattern starts from 110%. The falling part ends in both versions close to the same value as in statements (about 60%). The question intonation is realized by the sharp pitch jump and fall in the last but one

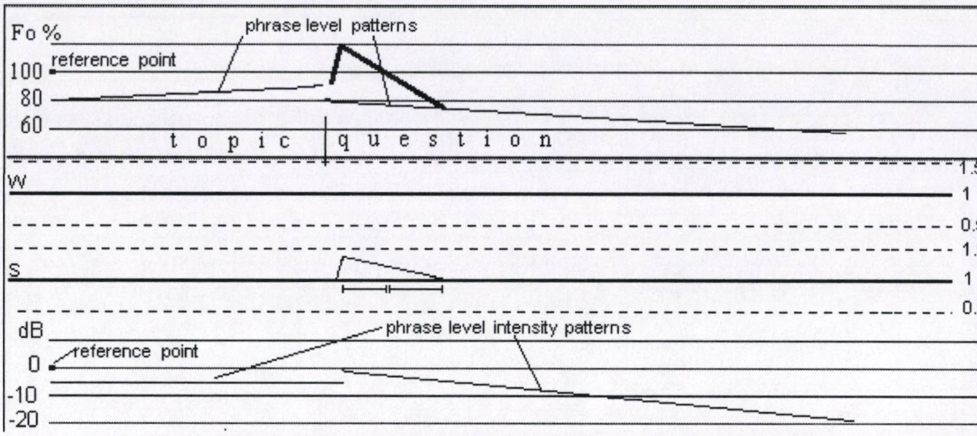



*Fig. 5*

The stylized patterns of a *wh*-question with a topic

*Ezt a témát illetőleg* ***mikor*** *válaszoltok a kérdéseimre?*

'Concerning this topic, when will you answer my questions?'

syllable. The jump is realized at the beginning of the nucleus of this syllable and the fall ends at the end of this syllable. The peak in this syllable may reach 120–130%.

Word accents are not present in the slowly rising part. This can be explained by the structure of this question type. The first part only prepares the way for the peak at the end which expresses the main information. The second form of this question with the level-fall intonation is pronounced in the case of expressing impatience or anger.

### 3.2.5. Yes/no questions with topic or focus

In this case the sentence is divided into two phrase level $F_0$ patterns. The sentence begins with a slightly falling structure (from 100% to 80%) until the end of the topic or the word in the focus position. This is followed by the second pattern which is similar to that shown in Figure 6B.

(5) (a) Holnap délután **elmentek végre moziba**?
'Tomorrow afternoon **will you go finally to the cinema**?'
(The question part is marked by bold letters.)

(b) A tegnap kiadott **szakácskönyvet** vetted meg a barátnődnek?
'Did you buy the **cook book** published yesterday for your girlfriend?'
(The word in focus is marked by bold letters.)

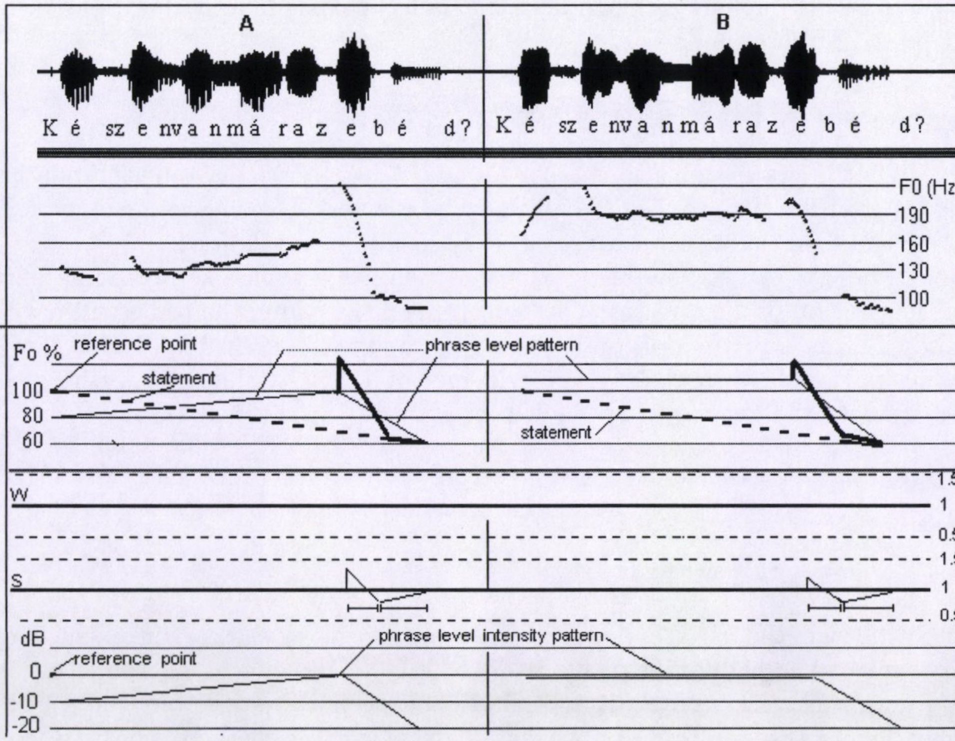



*Fig. 6*

Two realization forms (a) of a yes/no question and their stylized structures (b). *Készen van már az ebéd*? 'Is lunch ready now?'

It is important to mention that in yes/no questions the place of the peak on the last but one syllable is independent from word structure. Thus the peak can even be realized on an article if the last word of the question has one syllable.

(6) Elvetted **a** sót?
'Did you take **the** salt?'

The intensity curve of the standard yes/no question (Figure 6A) can be characterized by the following general structure: slowly rising until the last but one syllable (the range of the rise is 10 dB), the highest point takes place in that syllable. In the last syllable of the question the intensity falls to the level of −20 dB. In the variant (Figure 6B) the intensity is constantly high until the last but one syllable and the fall is realized from this point until the end of the sentence.

### 3.2.6. One and two-syllable yes/no questions

One-syllable yes/no questions (*Jó?* 'Good?', *Én?* 'Me?') have basically a rising $F_0$ contour (Figure 7A). The two-syllable ones (*Elég?* 'Enough?', *Ő volt?* 'Was it she/he?) can be characterized basically by a rise-fall.

If the one or two-syllable yes/no question has a topic-like preceding part, the intonation of the question part will remain the same, the topic will have a slowly falling structure preparing the way for the question part. This slowly falling part will start at 90% and will end at 70–80%. The point where the topic meets the question has the lowest $F_0$ value in the sentence.

(7) (a) Ennyi már **jó**?
'So many will already be **good**?'

(b) Ennyi már **elég**?
'So many will already be **enough**?'

In both cases, the rise starts definitely lower (60–80%) than a statement does. The end of the highest $F_0$ value is on 100–120% depending on the situation and emotion. The great distance in $F_0$ between the start and the highest point forms the question intonation. In one-syllable versions the rise itself is not linear. In the first part of the syllable the $F_0$ changes slowly, in the second, it changes abruptly. The duration of the vowel is much longer than in sentence internal position. In the case of two-syllable questions (Figure 7B, C) the rise-fall movement is realized mainly in the second syllable. If we want to fit these special cases into the unified description format, we have to define special syllable level modification forms.

### 3.2.7. Complex yes/no questions

The $F_0$ and intensity structure of these questions can be concatenated from the stylized patterns discussed earlier (Figure 8, page 292). For example, if the complex yes/no question contains two or more subquestions, the whole $F_0$ structure will contain two complete questions' phrase elements.

(8) Befejezed a **munkát** és megnézed a **filmet**?
'Will you finish the **work** and watch the **film**?'

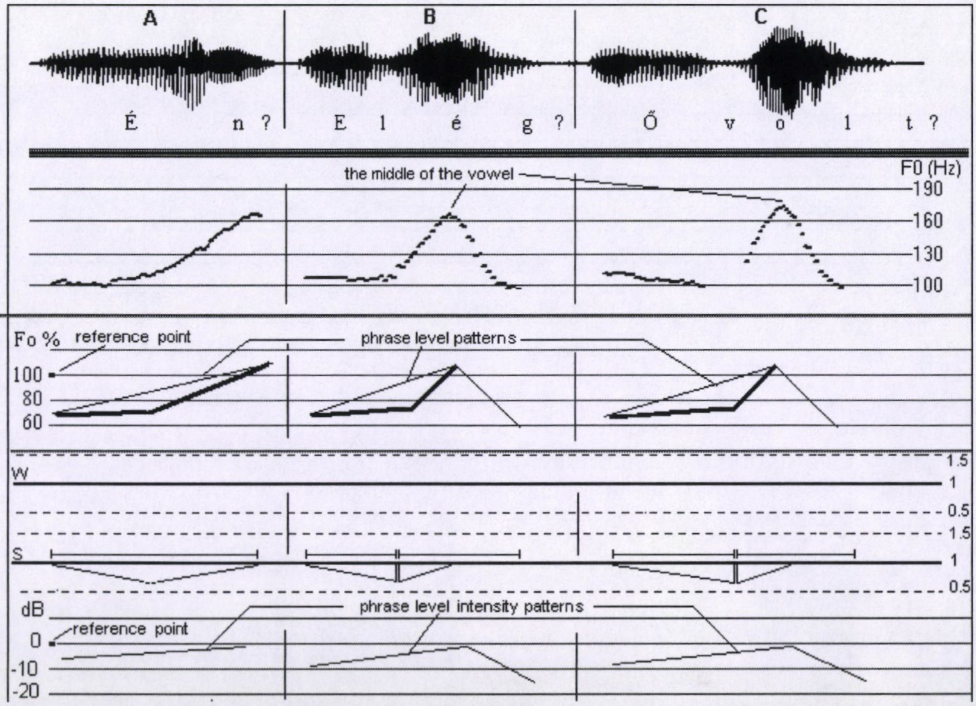



*Fig. 7*

The $F_0$ structure of the one and two-syllable yes/no questions (a) and their stylized representations (b)

As there are two questions in the sentence, the end of the falling parts at the phrase boundaries shows a general falling structure, the lowest $F_0$ value is at the very end of the question.

In a complex yes/no question like (9), the real question appears in the main clause (*Megnézed*), but the characteristic question pattern with the peak on the last but one syllable is at the very end of the sentence (*beszé**l**tél*). In this type of sentences the $F_0$ structure is similar to that shown in Figure 6B.

(9) Megnézed azt a filmet, amiről a múlt héten **beszéltél**?
'Will you watch that film about which you **spoke** last week?'

If the first part of the complex yes/no question functions as a topic, it will have a slowly descending $F_0$ pattern starting from 100% and ending on 80–85% and the question part will have its structure as shown in Figure 6B.

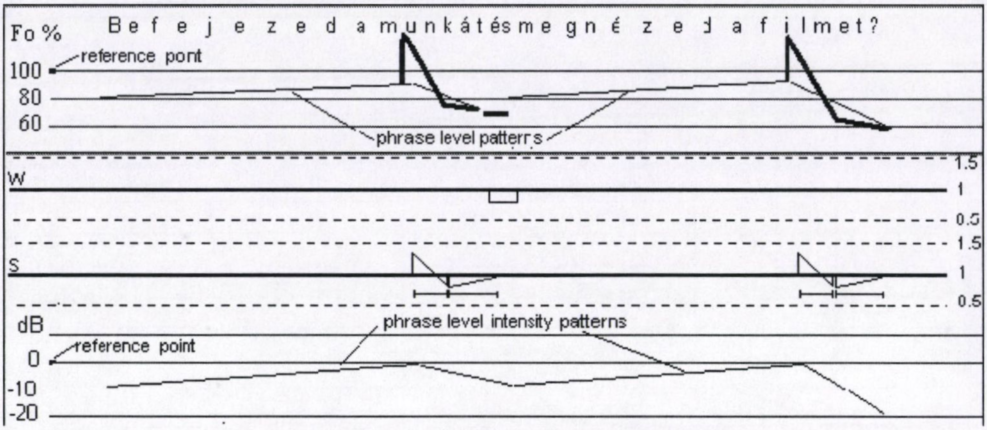



*Fig. 8*

The stylized $F_0$ and intensity structure of a complex yes/no question which comprises two questions

(10) Ha megnyernéd a főnyereményt, megvennéd a **házat**?
'If you won the jackpot, would you buy the **house**?'

### 3.2.8. Alternative questions

Alternative questions consist of two parts which are separated by the word *vagy* 'or'.

(11) (a) Az **első** vagy a **második** lehetőséget választod?
'Do you choose the **first** or the **second** possibility?'

(b) **Enni** akarsz vagy **inni**?
'Do you want to **eat** or to **drink**?'

(c) **Én** vagy **ő**?
'**Me** or **him/her**?'

The two parts can be treated as two phrases. In the first phrase the main $F_0$ pattern is basically rising (from 90% to 120%), in the second one falling (from 120% to 60%). Syllable level changes define the final, detailed $F_0$ curve as it is shown in Figure 9A. The rising takes place mainly in the second and third syllables of the first phrase (from 90% to 120%). The $F_0$ remains on 120% if this phrase has more than three syllables. The fall in the second phrase belongs mainly to the second syllable. Here the $F_0$ changes from 120% to 60–80%. The place of the endpoint depends on the length of this phrase.

If it has one or two syllables, the endpoint will be on 60%. If it is longer, the fall will be realized in two parts, i.e., from 120% to 80% and from 80% to 60%. The second fall begins in the third syllable and lasts till the end of the sentence independently of the length of this phrase (Figure 10). If the sentence consists of only three syllables, the rise will be shifted to the first syllable, the fall to the last (Figure 9B).

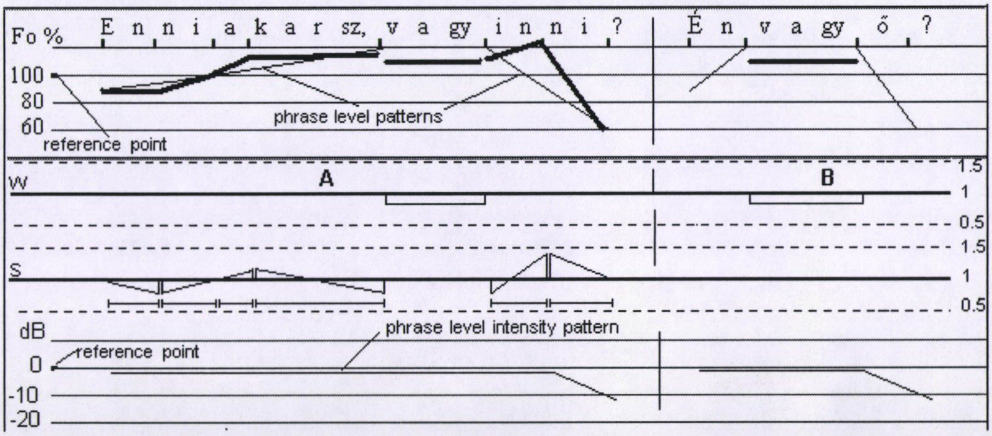



*Fig. 9*

The stylized melody and intensity structure of alternative questions having different numbers of syllables. Syllables are marked with short thick vertical lines below the text

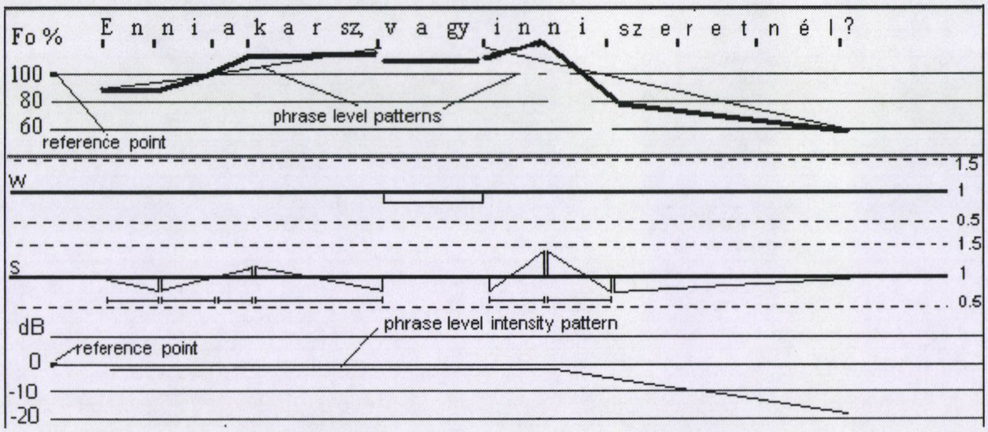



*Fig. 10*

The stylized melody and intensity structure of the alternative question *Enni akarsz vagy inni szeretnél*? 'Do you want to eat or you would like to drink?'

### 3.2.9. Elliptic questions

Unfinished questions have basically a rising character (from 80–90% to 120–130%). This pattern is fixed to the last syllables of the last word (Figure 11). If this word has a single syllable, the $F_0$ change will be realized on this syllable. In the case of two syllables, the rise is divided into two parts: in the first syllable a moderate rise will be produced (from 80–90% to 100%), in the second a sharper one from 100% to 120–130%. In the case of three or more syllables, the rise is divided into three parts along the last three syllables (Figure 11A).

(12) (a) És **ő**?
'And **he/she**?'

(b) És **Mari**?
'And **Mary**?'

(c) A **fizetésem**?
'My **salary**?'

Word accents may occur in the part preceding the last word.

(13) És a múlt havi fizetésem?
'And my salary from the preceding month?'

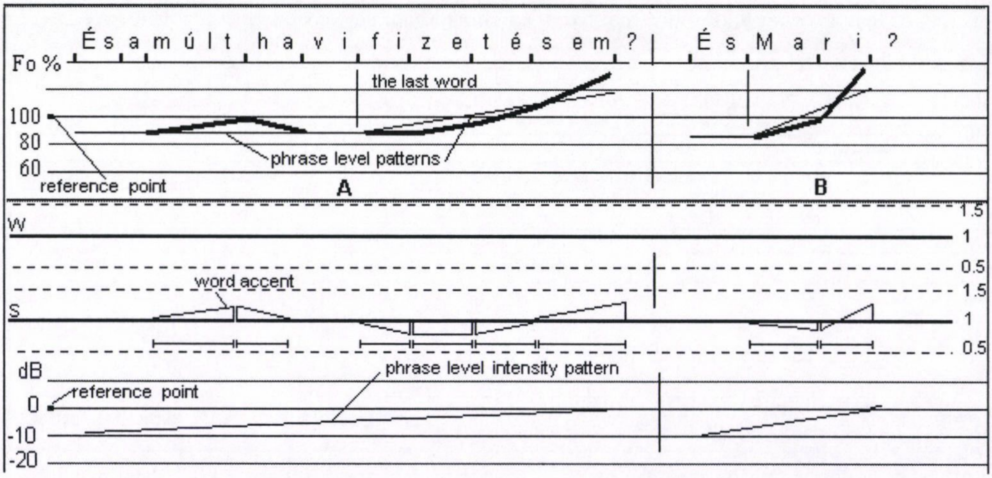



*Fig. 11*

The stylized melody and intensity structure of elliptic questions. The short thick vertical lines below the text mark syllable boundaries

### 3.2.10. Control questions

A control question occurs when we want, within a dialogue, to verify the information heard (shown by boldface in the example).

(14) A: Mikor indul a repülő?
'When does the plane start?'
B: 12 órakor.
'At 12 o'clock.'
A: **Mikor?**
**'When?'**

The number of syllables defines the structure of the pitch contour in control questions. In the case of one syllable, the same rising contour is generated as in one-syllable yes/no questions (Figure 7A). In the case of two syllables, the pattern is the same as shown in Figure 7B. If the control question has more than two syllables, the pitch contour will be the same as in simple yes/no questions (Figure 6).

If the control question concerns a whole statement, the $F_0$ structure may become complicated.

(15) A: Mikor mentél haza?
'When did you go home?' (normal question)
B: Azt kérdezted, mikor mentem haza?
'Did you ask when I went home?' (control question)

In the example, the first part of the control question (*azt kérdezted*) is realized as a yes/no question. The intonation in the second part may be different depending on the intention of the speaker. If the time is the questioned element (*mikor* 'when'), the second part will have the $F_0$ pattern of a yes/no question starting with low $F_0$ value (Figure 6A). If, however, the place is the questioned element (*haza* 'home'), the sound sequence *mikor mentem* ('when did I go') will have a similar $F_0$ pattern as it was in the *wh*-questions and the last word, *haza*, will have a rise-fall in the last syllable as shown in Figure 7B for two-syllable yes/no questions.

### 3.2.11. Morphologically marked questions

Although in most cases it is intonation that differentiates between statements and questions, Hungarian has the possibility to signal a question also with morphemes. The morpheme *-e* attached to the verb means that the sentence is a question, the $F_0$ pattern of which is similar to that of statements.

(16) **Elkészíted-e** holnapra a cikket?
'**Will you make** the article for tomorrow?'

The same case occurs when the particle *ugye* introduces the question.

(17) **Ugye** elmész külföldre?
'You travel abroad, **don't you**?

In this case two phrase level patterns characterize the question: the first is rising, the second is falling (Figure 12A). The beginning of the rise is around 80%, the end is on 100%. The fall has similar structure as a *wh*-question. If the particle *ugye* closes the question (Figure 12B), the two-syllable control question intonation is manifested in it, the essential part of the question, the first phrase, will have similar structure to that of a *wh*-question, and the second one will be realized as a two-syllable yes/no question.

(18) Elmész külföldre, **ugye**?
'You travel abroad, **don't you**?

### 3.3. Sentences ending with an exclamation mark

#### 3.3.1. Requests

Of the many different forms of requests, we analyzed the one in which the intonation carries the fact of request and the tone of voice expresses a kind request coloured by a slight impatience.

(19) Adja már meg az érkezés időpontját!
'Would you give me the time of the departure?'

The results of the analysis are the following: the phrase level $F_0$ pattern is a rise-fall. The starting point of the rise is lower (80%) than in a declarative sentence, the end point is close to 100%. The fall ends at the 70% value (higher than in statements). The final, detailed $F_0$ curve is formed by syllable level modifications in the first three syllables of the sentence. Word accents do not occur in these requests. The intensity structure of these sentences begins with a lower value (−6 dB) than in a statement. The highest intensity value can be found in the second syllable, the remaining part will have a descending intensity value down to −15–20 dB. The stylized $F_0$ and intensity patterns are shown in Figure 13 (page 298).

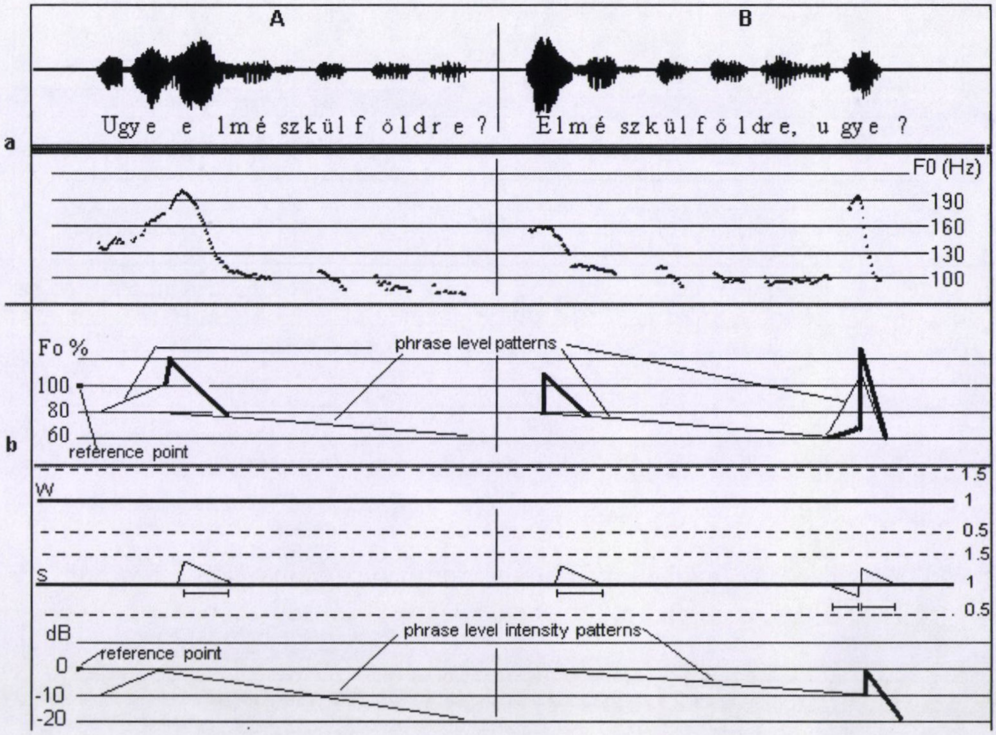



*Fig. 12*

The $F_0$ structures (a) and the stylized forms (b) of questions beginning or ending with the word *ugye*

### 3.3.2. Warnings

Warnings have many representation forms, depending on the situation in which they occur. In the present study we analyzed those warnings in which the listener's attention was drawn to a mistake.

(20) Rosszul csinálod!
'You do it wrong!'

The phrase level $F_0$ pattern is falling. Both the beginning and end points are higher than in a statement. A slight modification on this falling pattern is made in the first two syllables. The intensity is generally higher by 5–10 dB in comparison with statements.

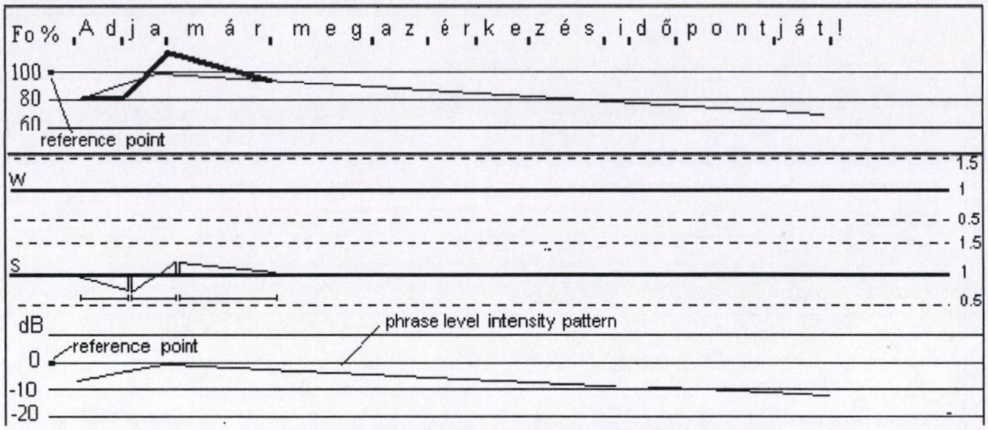



*Fig. 13*
The stylized $F_0$ and intensity structure of a request

The stylized $F_0$ and intensity representation of this type of warning is shown in Figure 14.

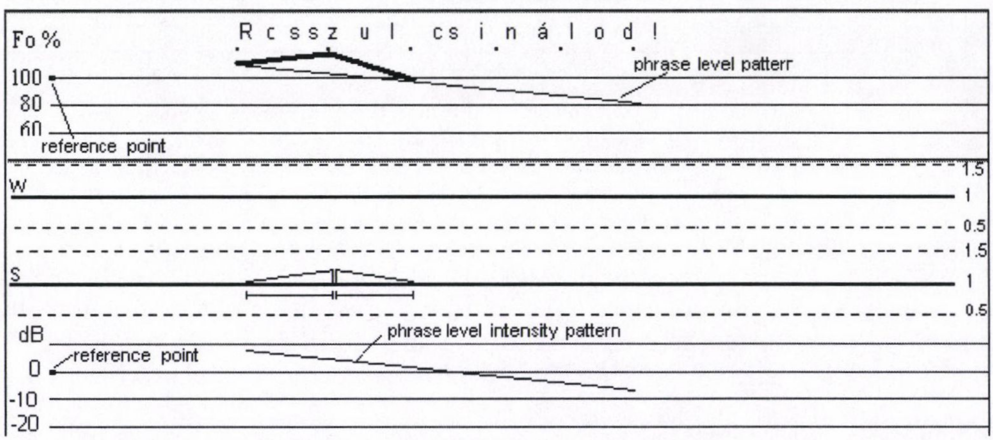



*Fig. 14*
The stylized $F_0$ and intensity structure of a warning. The short thick vertical lines under the text mark syllable boundaries

### 3.3.3. Commands

Various degrees of temperament have been found among the commands analyzed. The increase of temperament was realized mainly by increasing the intensity level and also the value of $F_0$. The results of the analysis are as follows. The phrase level $F_0$ pattern is similar to that of a *wh*-question (from 80% to 60%). This pattern is modified in the first syllable as shown in Figure 15. The intensity structure is similar to that in warnings.

(21) Ne menjetek oda!
'Do not go there!'

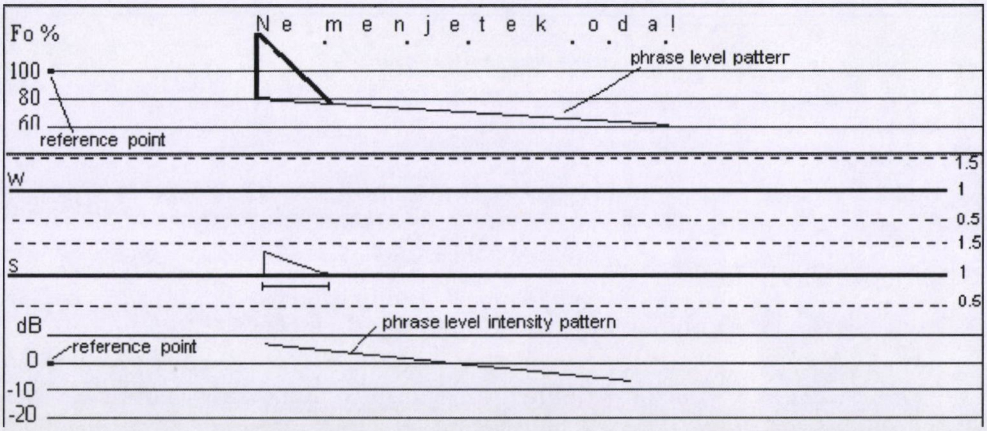



*Fig. 15*
The stylized $F_0$ and intensity structure of a command

### 3.3.4. Sentences expressing desire

Mainly sentences beginning with the interjection *Bárcsak...* 'If only...' have been analyzed.

(22) Bárcsak eljönne a barátom!
'If only my friend would come!'

The phrase level $F_0$ pattern is falling. The $F_0$ begins on a slightly lower frequency (90%) than in statements and ends on 80%. The desire is expressed by a syllble level pitch peak (120–130%) in the first syllable. The height of the peak depends on the emotional level of the speaker. The stronger the desire the higher the peak. The stylized representation is shown in Figure 16 (overleaf).

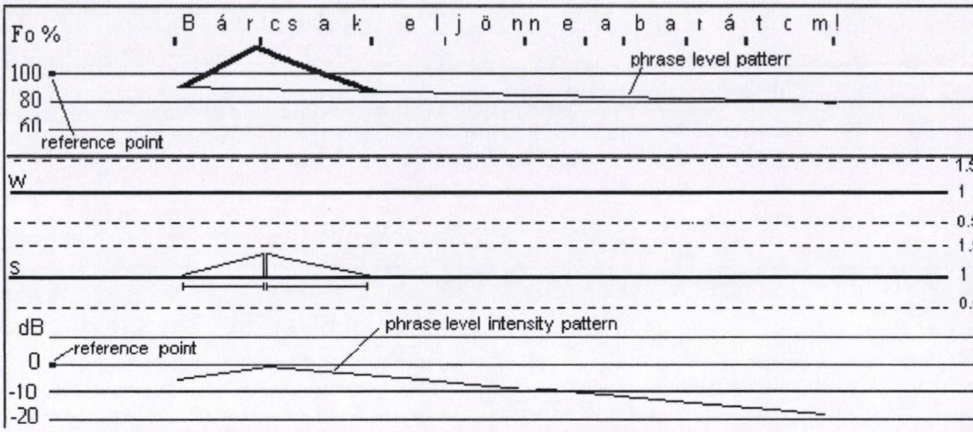



*Fig. 16*
The stylized $F_0$ and intensity structure of a sentence expressing desire

## 4. Verification of the stylized patterns

The $F_0$ and intensity patterns defined for the most important sentence types in a unified form have been verified in two manners. First the stylized $F_0$ and intensity patterns have been superimposed on natural sentences by the PDS Prosody Composer tool (Olaszy et al. 2001). This tool enables the researcher—among other things—to change the original $F_0$ pattern of a natural sentence to a predefined one. Thus the original and the processed sentence differ only in one parameter, $F_0$ structure. Listening to the processed sentence one can evaluate how the modelled melody sounds in comparison with the original one. This check makes it possible to find the weak points of the modelled patterns and the model can be adjusted more precisely by listening. Such tests and corrections have been carried out by a trained phonetician. After this work, a series of listening tests was organized for general evaluation.

### 4.1. Listening tests

Two listening test have been carried out. The aim of the first was to compare the natural and synthetically generated $F_0$ and intensity patterns, in the second one the prosody of generated dialogues was tested.

### 4.1.1. Test 1

The test material consisted of ten sentence pairs. In each pair, two sentences were put one after the other separated by a pause of three seconds. The first sentence was natural and served as a carrier sentence for the second one. In the second sentence the predefined $F_0$ pattern (according to the data of the unified $F_0$ scale) was superimposed on the body of the carrier sentence. Thus, the two sentences in each pair were identical except for the realization of their $F_0$ structure. Ten such sentence pairs (three *wh*-questions, two yes/no questions, three commands, one request and one statement) were prepared and used in the test. 20 subjects (eight female and twelve male persons, aged from 25 to 55) had to mark in a scale how close the simplified and modelled $F_0$ pattern was to the natural one. The task was: Compare the melody of the two sentences and evaluate them according to the following scale: they are the same, very similar, similar, less similar, different.

### 4.1.2. Results

The distribution of the responses is shown in Figure 17 (overleaf). Summarizing the results of the first three columns, 86.5% of the responses found the modelled $F_0$ structure similar to the original one (or better). This high score allows us to declare that the description of the phrase level $F_0$ patterns and the word and syllable level local modifications on it represent the structure of Hungarian $F_0$ patterns at the sentence level tolerably well. The sentences receiving the "less similar" (or worse) evaluation were examined once more concerning the modelled $F_0$ structure. It became clear that the basis of these negative judgements was not only the slight difference between the natural and modelled $F_0$ structures: in some cases they were rather due to a slight difference in the general fundamental frequency level of the two sentences (for example, the natural sentence sounded slightly higher than the modelled one, but the form of the $F_0$ structure was very similar). This latter case was due to the fact that during the whole procedure the reference point was given the same value. In natural speech the general $F_0$ level may change by 2–8 Hz from sentence to sentence. Thus, in some sentences the modelled $F_0$ structure sounded slightly different in terms of general $F_0$ height. Some subjects found this difference enough to give a response "less similar" or "different".

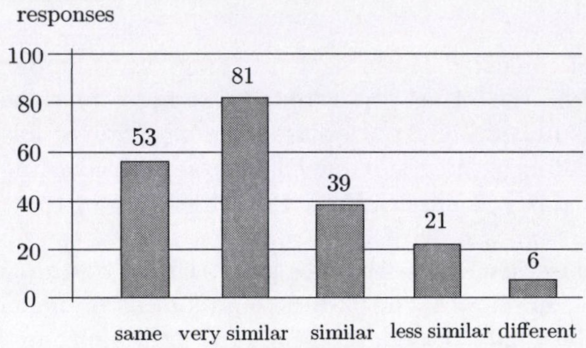



*Fig. 17*
Evaluation results of the comparison of natural and predefined $F_0$ structures of Hungarian sentences

### 4.1.3. Test 2

The goal of this test was to find out whether concatenated unified melody forms—meant to characterize the complex melody of a dialogue—actually give the impression of dialogue. Dialogue elements (two or three sentences concatenated one after the other) have been constructed according to the modelled $F_0$ structures using natural carrier sentences. Various transformations have also been made concerning their $F_0$ structure (for example: statement, control question and final statement).

(23) (a) A tervezett tárgyalás után levelet írok a külföldi partnernek.
'After the planned discussion, I will write a letter to the foreign partner'
(basic carrier sentence)

(b) A tervezett tárgyalás után?
(control question, generated from the first part of the carrier sentence)

(c) A tervezett tárgyalás után.
(final strengthening statement, generated from the control question)

In the transformed sentences the time structure of the sound sequences was not changed only the $F_0$ structure and intensity structure were set according to the previously defined values. The Hz value of the reference point was the same in all sentences. Four dialogues were constructed. The question for the subjects (the same persons as in the first test) was: How do you evaluate the melody pattern of the whole dialogue? They could make a choice from the following scale: very good, good, acceptable, poor. The results are shown in Figure 18.

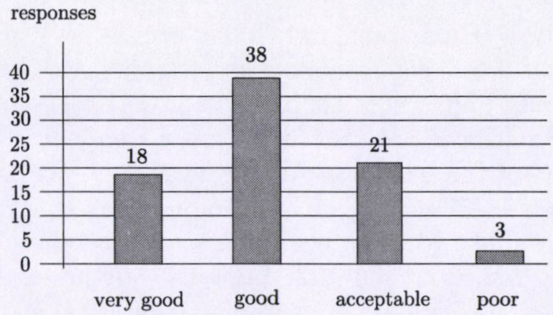



*Fig. 18*
Evaluation results of the general $F_0$ structure of the four dialogues

Summarizing the results of the first three columns, 96.25% of the responses found the modelled $F_0$ structure of the dialogues acceptable or better. This high score shows that the intersentence melody structure defined in the unified $F_0$ scale gives good $F_0$ patterns for dialogues as well. Thus the melody pattern of dialogues can be predicted directly from the text.

## 5. Conclusions

This research concentrated on the systematic description of the intonation and intensity structures of the most frequent Hungarian sentence types (statements, questions, warnings, requests, commands and sentences expressing desire). The description of the melody and the intensity is given in a unified scale in which the beginning point of a statement is fixed as a reference (100% or 0 dB). Thus the patterns building up different sentences can be compared directly with each other and can be transformed from one to the other. The unified scale helps to express the mapping among the melody forms of the sentences. The description of the $F_0$ and intensity patterns is based on three data structures: the phrase level function (with stylized straight lines), the word level functions and the syllable level modifications (with stylized contours). The word and syllable level functions are expressed by linear changes of multiplication factors in the range 0.5–1.5. The final function is calculated by multiplicating the phrase level function value with the word and syllable level ones. Using this model, the prosody of any text can be predicted without an acoustic analysis if the following information is available: the sentence type, the sentence structure, the phrase boundaries and the accent distribution.

In the prosody of Hungarian, the falling phrase level pattern is characteristic of the majority of sentence types (statements, *wh*-questions, requests, warnings, commands and sentences expressing desire). The beginning and end points of the patterns are sentence type dependent. These differences constitute the basis of the intonation of the given sentence. The rising phrase level pattern is characteristic only in yes/no questions and in control and elliptic ones. The syllable and word level local changes—modulating the phrase contour—have an important role in forming the adequate, final melody pattern of the sentence. The range of pitch movements (taking into account the local changes as well) is between 140% and 60%.

The intensity structure of the analyzed sentences can be summarized as follows. The intensity level is high if the $F_0$ is high and vice versa. The range of intensity changes was not more than 30 dB.

In some cases, rules could be formulated about the relation of sentence structure and melody. Topic-focus organization has both structural cues and intonational consequences in Hungarian. The intonation of the topic depends on the intonation of the main part. We found that a falling intonation of the main part—as in *wh*-questions and alternative questions—requires a rising pitch contour for the topic part. However, a rising melody contour in the main part—as in yes/no questions—is preceded by a descending one in the topic part. As to the transformation possibilities among different modalities, the realization of the proper intensity contour may be as important as the realization of the proper $F_0$ curve. This is the case mostly when questions having a rising contour are formed from statements.

Experiments have been carried out to predict and synthesize the prosody of dialogues (using the stylized patterns). The synthesized sentences expressed the internal meaning of the dialogue and the situation quite well.

This study showed that a well-determined $F_0$ and intensity pattern set can be defined to characterize the prosodic elements of the most important Hungarian sentence types. The pattern set can be used for prosody prediction on the text level. The general results can be used in speech synthesis, speech recognition, language learning programs and in general speech research as well.

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# THE INTONATION OF MONOSYLLABIC HUNGARIAN YES-NO QUESTIONS

LÁSZLÓ VARGA

## Abstract

The paper examines the intonation of monosyllabic Hungarian yes-no questions, which, according to the literature, is different from the intonation of polysyllabic Hungarian yes-no questions. The paper's conclusion is that the difference is only phonetic, not phonological. From a phonological point of view, such questions carry a rising-falling intonation pattern, just like their polysyllabic counterparts. This is proved by the facts of contour concord, which we can observe between the melodies of so called equivalent blocks in Hungarian sentences (Varga 2002, 100–2). From a phonetic point of view, however, the falling part of the abstract rising-falling pattern is normally truncated, leaving only a rise. The final fall (in the form of a downglide) is optionally preserved in surprised monosyllabic yes-no questions, when the syllable has a long vowel in it, able to accommodate the downglide.

## 1. Introduction

It has been alleged that there are "four kinds of questioning intonation" in Hungarian yes-no questions (Bartók 1978). These are the following:

(i) The melody of yes-no questions with a final stress group containing one syllable, e.g., ***Víz***? ('Water?'), or ***Dé**lutánra **lesz***? ('Will there be any by the afternoon?').[1]

(ii) The melody of yes-no questions with a final stress group containing two syllables, e.g., ***Es**te*? ('In the evening?'), or ***Szom**baton **itt** vagy*? ('Are you here on Saturday?').

(iii) The melody of yes-no questions with two stress groups, where the final stress group contains three or more syllables, e.g., ***Hol**nap **in**dulunk*? ('Are we leaving tomorrow?').

[1] The syllables set bold in the examples are stressed. Accent marks over certain vowel letters, as in e.g., *víz* or *délutánra*, indicate vowel length in Hungarian orthography and have nothing to do with stress.

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(iv) The melody of yes-no questions with one stress group, where this stress group consists of three or more syllables, e.g., ***Fel**ment a hegyekbe*? ('Did he go up to the hills?').

Bartók (ibid.) claims that these are distinct melodies. This may be so from a strictly **phonetic** point of view, but certainly not from a **phonological** point of view. Phonology looks for the systematic aspects of sound phenomena (including intonational phenomena) that are involved in meaning distinctions in a particular language. Phonologically, the four kinds of melody are actually just predictable variations of **a single intonation pattern**, conditioned by the number of syllables on which the pattern is realized (Varga 1983; 1993; 1996). This pattern is the Hungarian **rising-falling intonation contour**, one of the abstract intonation contours (so called "character contours") that constitute the Hungarian intonational lexicon.

As a matter of fact, two of the four melodies distinguished by Bartók, viz. (iii) and (iv), can be conflated even under a strictly phonetic approach because the melody of the relevant final stress group, which expresses questionhood, is identical in both. So the number of the phonetic variants can be reduced to three. These three are the (a) one-syllable, (b) two-syllable, and (c) three-or-more-syllable versions of the same intonation pattern. These varieties are interesting inasmuch as they are the phonetically identified positional alternants ("allo-contours") of the abstract rising-falling intonation contour of Hungarian (cf. Varga 1983, 124; Fónagy 1998, 334). A simplified autosegmental representation of this abstract contour is (1):[2]

(1) L*HL

For instance, the utterance ***Ma**rika néni*? ('Aunt Mary?'), used as a yes-no question, is realized as is shown in the intonational diagram of (2), in which the associations of the syllables with the tones of the autosegmental representation are also displayed.

[2] Different schools offer slightly different autosegmental representations for this contour, e.g., L*HL% (Ladd 1996, 116ff), L*H-L% (Grice et al. 2000), L*.H.L$ (Varga 2002). These are due to differences in conventions and theory-internal considerations that should not concern us in the present study.

(2)

Mari ka né ni? (yes-no question)

L* H L

There is considerable consensus as to the phonetic content of version (c), i.e., the three-or-more-syllable realization, illustrated in (2). In this, there is a significant drop of pitch between the penultimate syllable and the ult, and the syllables before the penult form either a gradually rising sequence or a level sequence but then the penult steps up.[3] As for the disyllabic realization, version (b), the second syllable steps up and has a downglide, although this downglide may be less conspicuous if the second syllable is short and ends in a voiceless consonant. It is the monosyllabic realization, version (a), in connection with which judgments differ and which I wish to examine in this paper.

## 2. The problem of monosyllabic variants

According to some views, in its monosyllabic realizations the contour simply rises and there is no downglide at the end (cf. Deme 1962, 506; Fónagy–Magdics 1967, 40; Fónagy 1998, 334).[4] Deme (ibid.) adds that this monosyllabic rise is not to be regarded as a truncation of the polysyllabic rise-fall, and that it has most probably emerged as the direct opposite of the fall of monosyllabic statements. Interestingly, however, Deme (1962, 513) recognizes the possibility of the downglide in a surprised (repeated) monosyllabic question such as *Nincs*? ('Is there really none?'). Other researchers claim that the downglide is part of yes-no question intonation even in monosyllabic realizations (Molnár 1954, 29; Gårding–Szende 1974, 339). In Varga (1996, 117) I tried to follow a middle course by saying that "[t]his contour goes up and down in the syllable when it appears on a monosyllabic utterance [...], but the falling part may be physically missing, especially if the syllable is short or

[3] In a third subvariety the second syllable steps up and the pitch remains at that height until the penult is reached and then there is a drop between the penult and the ult. According to Grice et al. (2000), this is typical of Transylvanian Hungarian.

[4] According to more detailed descriptions, the physical rise itself is not steady but consists of a gentle initial and a steep final part, cf. Olaszy–Koutny (2001, 187). I shall refer to this realization as "gentle rise plus steep rise".

ends in a voiceless consonant." Grice et al. (2000) conclude that the rising-falling contour may be truncated, leaving only the rise.

Since the opinions cited have primarily been based on auditory impression, the following questions have to be answered using instrumental evidence.

(3) RESEARCH QUESTIONS

(a) Is there a downglide at the end of the contour in ordinary (non-surprised) monosyllabic yes-no questions if the syllable has a long vowel with no consonant or a voiced consonant in the coda?

(b) Is there a downglide at the end of the contour in ordinary (non-surprised) monosyllabic yes-no questions if the syllable has a short vowel and ends in a voiceless consonant?

(c) Is there such a downglide in surprised (repeated) monosyllabic yes-no questions?

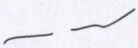
(d) In those instances where there is no downglide, (how) does the phonetically rising contour of the yes-no question differ from the (both phonologically and phonetically) rising contour of complementary questions?

Points (3a) and (3b) have been distinguished to enable us to test the hypothesis that a longer tone-carrying part (voiced stretch) within the rhyme of the syllable can accommodate the final downglide better than a short tone-carrying part.

The last point (3d) is important because there exists a truly rising intonation pattern in Hungarian, quite independently of yes-no questions. This appears on so called **complementary questions** (the term is from Bolinger 1957).[5] A complementary question is the initial part of a sentence (typically the topic or a conjunction) which remains if we ellipt the final part (the comment or the post-conjunction part of the sentence), offered as a question to be considered by the listener, with a rising intonation, suiting different pragmatic contexts. These pragmatic contexts or situations may be of various kinds, e.g., personal data checking (e.g., ***Ne**ve?* 'Your name?'), polite offering (e.g., ***Ká**vét?* 'Coffee?'), initiation of new topic (e.g., *És a **nagy**mama?* 'And grandma?'), encouragement to continue (e.g., ***És**?* 'And?'), etc., as in (4).

[5] It also appears on certain non-final sentence constituents, but here we shall restrict our attention to complementary questions.

(4)



Marika néni? (complementary question)

L* H

Such questions have an undisputable rise in all the three phonetic contexts we distinguished, i.e. in the one-syllable, two-syllable and the three-or-more-syllable versions alike, and the simplified autosegmental representation of this abstract contour in all three cases is L*H. Therefore the rising intonation of monosyllabic complementary questions offers a basis for comparison with the alleged phonetic rise of monosyllabic yes-no questions.

## 3. A pilot experiment

In order to obtain data for my research I have compiled six mini-dialogues (5)–(10):

(5) A: Valaki megkapja. ('Someone will get it.')
B: Én? ('Me?', literally: 'I?')

(6) A: Hat óra van. ('It is 6 o'clock.')
B: Hat? ('Six?')

(7) A: Ők holnap kapják. ('They will get it tomorrow.')
B: És én? ('And I?')

(8) A: Mit gondolsz, mennyi marad? ('How many do you think will remain?')
B: Hat? ('Six?')

(9) A: Te fogod megkapni. ('You'll get it.')
B: Én? ('Me?', literally: 'I?')

(10) A: Öt nem lesz elég. ('Five will not be enough.')
B: És hat? ('And six?')

The (B) utterances (responses) in the above exchanges are the questions to be examined. (5B) represents an ordinary (non-surprised) monosyllabic yes-no question which has a long vowel followed by a voiced consonant (*Én?*). (6B) is a surprised (repeated) monosyllabic yes-no question which has a short vowel followed by a voiceless consonant (*Hat?*). (7B) is a monosyllabic complementary question which has a long vowel followed by a voiced consonant

(*És én?*, with *én?* being the relevant part). (8B) realizes an ordinary (non-surprised) monosyllabic yes-no question containing a short vowel followed by a voiceless consonant (*Hat?*). Then in (9B) we have a surprised (repeated) monosyllabic yes-no question which has a long vowel followed by a voiced consonant (*Én?*). Finally, (10B) exemplifies a monosyllabic complementary question with a short vowel followed by a voiceless consonant (*És hat?*, with *hat?* being the relevant part).

The exchanges were deliberately arranged in this order, (5) to (10), so that similar types should not be adjacent, and the prosodic solutions of adjacent exchanges should not affect each other. The exchanges were written down and submitted to five (young and middle-aged) native speakers of Hungarian.Three of them were female (MH, KSz, and ÉB) and two male (CsCs and GB). In the course of the experiment I sat down with each of the participants separately and playacted all the exchanges with them in such a way that I read the A part and the participant read the B part, and all the exchanges so produced were taperecorded. The participants were allowed to rehearse their part and they did not hear the other participants' solutions. The taperecorded five renderings of each of the six B responses, i.e., 30 renderings in all, constituted the corpus of the investigation. This corpus was then submitted to simultaneous visual and acoustic analysis by means of a CSL 4300B digital processor at the Phonetic Department of the Research Institute for Linguistics of the Hungarian Academy of Sciences. The analysis established the duration of the last (or only) syllable of each utterance in milliseconds, and the fundamental frequency values at the beginning (Point I), at the middle (Point II), and at the end (Point III) of that syllable.

## 4. The data obtained

The results of the experiment will now be presented in the following order:

(11) ORDER OF PRESENTATION

(a) Ordinary (non-surprised) monosyllabic yes-no question containing a long vowel followed by a voiced consonant (5B).

(b) Ordinary (non-surprised) monosyllabic yes-no question which has a short vowel followed by a voiceless consonant (8B).

(c) Surprised (repeated) monosyllabic yes-no question containing a long vowel and a voiced consonant (9B).

(d) Surprised (repeated) monosyllabic yes-no question which has a short vowel followed by a voiceless consonant (6B).

(e) Monosyllabic complementary question which has a long vowel followed by a voiced consonant (7B).

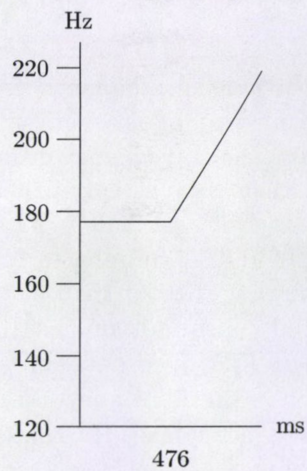
(f) Monosyllabic complementary question which has a short vowel followed by a voiceless consonant (10B).

This order of presentation groups the similar types together and makes comparison easier than the original order in which the recordings were made. The data are presented in six tables, each of these has five rows for the data obtained from the five participants, and a sixth row (shaded) for the average values. Each table is followed by a schematic intonational diagram constructed on the basis of the average values. In these diagrams the horizontal scale represents the average duration of the syllable (1mm = 20ms), while the vertical scale represents the average fundamental frequency values of the responses measured at the beginning, middle, and end of the syllable (1mm = 2Hz). By connecting the fundamental frequency values with straight lines we obtain the average schematic pitch curve for each question type.

(12) DATA FOR (5B): *Én?*

An ordinary (non-surprised) monosyllabic yes-no question containing a long vowel followed by a voiced consonant:

| Participant | Duration (ms) | Fo (Hz) I. | Fo (Hz) II. | Fo (Hz) III. |
|---|---|---|---|---|
| 1 | 557 | 224 | 185 | 263 |
| 2 | 477 | 115 | 126 | 141 |
| 3 | 397 | 188 | 190 | 229 |
| 4 | 491 | 165 | 185 | 238 |
| 5 | 459 | 180 | 182 | 200 |
| **Average** | **476** | **174** | **174** | **214** |



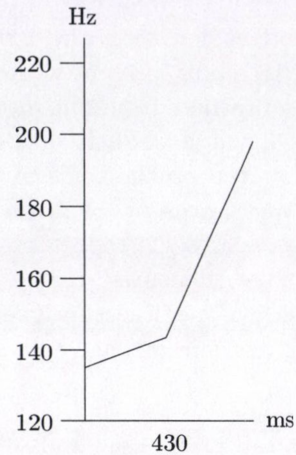
5B: Én?

In (5B) the fundamental frequency does not glide down in the final portion. Instead, it rises steeply in the final portion, whereas it stagnates or descends or rises gently in the first half of the syllable. The average values display stagnation at about 174 Hz in the first half of the syllable and a substantial rise of 40 Hz in the second half, with an average peak of 214 Hz at the end of the contour.

(13) DATA FOR (8B): *Hat?*

An ordinary (non-surprised) monosyllabic yes-no question which has a short vowel followed by a voiceless consonant:

| Parti-cipant | Dura-tion (ms) | Fo (Hz) I. | Fo (Hz) II. | Fo (Hz) III. |
|---|---|---|---|---|
| 1 | 491 | 173 | 170 | 294 |
| 2 | 477 | 80 | 103 | 119 |
| 3 | 366 | 128 | 136 | 227 |
| 4 | 360 | 181 | 196 | 219 |
| 5 | 459 | 112 | 100 | 114 |
| **Average** | **430** | **135** | **141** | **195** |



8B: Hat?

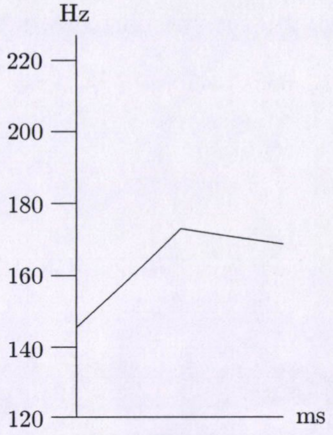
In (8B) the fundamental frequency does not glide down in the final portion. But instead of stagnating in the first half of the syllable, as in (5B), the fundamental frequency either descends slightly (in two cases) or rises slightly, and then rises steeply in the second half of the syllable. On an average, the rise in the first half is merely 6 Hz, whereas the rise in the second half is 54 Hz and it culminates in a final peak of 195 Hz. The average duration is somewhat shorter than in the case of (5B), where we had a long vowel and a voiced consonant in the rhyme of the syllable.

In (9B) (see data on facing page), the fundamental frequency may glide down in the final portion of the syllable. In one case it rises 97 Hz in the first half to a peak of 312 Hz and falls back 140 Hz in the second half. In other cases it rises gently or stagnates in the first half, and rises more radically in the second. The average shows a rise of 29 Hz in the first half to reach a peak of 174 Hz in the middle, to be followed by a descent of 2 Hz in the second half. The average duration is considerably longer than that of its non-surprised counterpart, (5B).

(14) DATA FOR (9B): *Én?*

A surprised (repeated) monosyllabic yes-no question containing a long vowel and a voiced consonant:

| Participant | Duration (ms) | Fo (Hz) I. | Fo (Hz) II. | Fo (Hz) III. |
|---|---|---|---|---|
| 1 | 655 | 178 | 196 | 240 |
| 2 | 477 | 108 | 106 | 130 |
| 3 | 549 | 120 | 138 | 192 |
| 4 | 655 | 215 | 312 | 172 |
| 5 | 436 | 102 | 118 | 126 |
| **Average** | **554** | **145** | **174** | **172** |

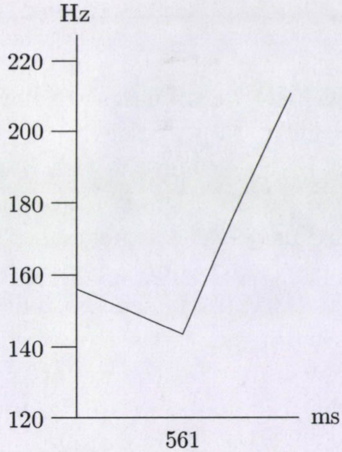



554
9B: Én?

(15) DATA FOR (6B): *Hat?*

A surprised (repeated) monosyllabic yes-no question which has a short vowel followed by a voiceless consonant:

| Participant | Duration (ms) | Fo (Hz) I. | Fo (Hz) II. | Fo (Hz) III. |
|---|---|---|---|---|
| 1 | 459 | 238 | 161 | 259 |
| 2 | 637 | 117 | 121 | 150 |
| 3 | 397 | 188 | 190 | 229 |
| 4 | 721 | 125 | 135 | 253 |
| 5 | 590 | 92 | 96 | 136 |
| **Average** | **561** | **152** | **141** | **205** |



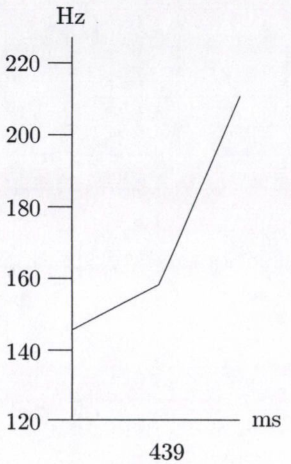

561
6B: Hat?

In (6B), in most cases there is a gentle rise in the first half and a radical rise in the second half of the syllable. However, in one case there is a very substantial drop between the beginning and the middle, followed by a considerable rise between the middle and the end. This causes the average curve to scoop in the middle, there is an 11 Hz descent in the first half and a 64 Hz rise in the second half of the syllable. The average peak is 205 Hz at the end of the contour. The average duration is the longest of all, despite the fact that the syllable has a short vowel and a voiceless consonant in its rhyme.

(16) DATA FOR THE FINAL SYLLABLE IN (7B): *(És) én?*

A monosyllabic complementary question which has a long vowel followed by a voiced consonant:

| Participant | Duration (ms) | Fo (Hz) I. | Fo (Hz) II. | Fo (Hz) III. |
|---|---|---|---|---|
| 1 | 396 | 198 | 222 | 281 |
| 2 | 350 | 103 | 111 | 129 |
| 3 | 366 | 138 | 145 | 253 |
| 4 | 524 | 185 | 208 | 250 |
| 5 | 557 | 96 | 101 | 121 |
| **Average** | **439** | **144** | **157** | **207** |



7B: Én?

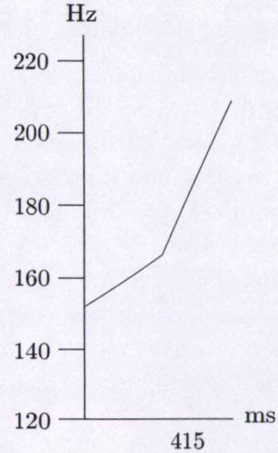
In (7B), in all cases we have a gentle rise in the first half of the syllable, and a more radical rise in the second. On the average, the rise in the first half is 13 Hz, while the rise in the second is 50 Hz, and the peak, reached at the end, is 207 Hz. The average duration of this type is shorter than that of its ordinary yes-no question counterpart, (5B), and much shorter than that of its surprised yes-no question counterpart, (9B).

In (10B) (see data on facing page), the pattern is very similar to the previous one: we can observe a gentle rise followed by a steeper rise in the two halves of the syllable. The average frequency values rise 13 Hz during the first half and 40 Hz during the second half of the syllable, to a final peak of 204 Hz. The average duration of this type is somewhat shorter than that of its ordinary yes-no question counterpart in (8B), and again much shorter than that of its surprised yes-no question counterpart, (6B).

(17) DATA FOR THE FINAL SYLLABLE IN (10B): *(És) hat?*

A monosyllabic complementary question which has a short vowel followed by a voiceless consonant:

| Participant | Duration (ms) | Fo (Hz) I. | Fo (Hz) II. | Fo (Hz) III. |
|---|---|---|---|---|
| 1 | 459 | 172 | 176 | 259 |
| 2 | 466 | 114 | 125 | 138 |
| 3 | 310 | 149 | 168 | 212 |
| 4 | 380 | 196 | 217 | 238 |
| 5 | 459 | 122 | 132 | 172 |
| **Average** | **415** | **151** | **164** | **204** |



10B: Hat?

## 5. Conclusions

By an analysis of the data obtained we can draw the following conclusions:

(i) In ordinary (non-surprised) yes-no questions there is no downglide in the second half of the syllable.

(ii) In surprised (repeated) yes-no questions there may be a final downglide.

(iii) The downglide in monosyllabic surprised yes-no questions appears only when the syllable has a long vowel followed by a voiced consonant and not when the syllable has a short vowel followed by a voiceless consonant.

(iv) The surprised yes-no questions have a considerably longer duration than the corresponding ordinary yes-no questions and a somewhat longer duration than the corresponding complementary questions.

(v) The rising realizations of the monosyllabic yes-no questions (both ordinary and surprised ones, but especially the latter) show considerably more melodic variation than just always being sequences of "gentle rise plus steep rise", recognized in the literature. In addition to the "gentle rise plus steep rise", we also have combinations of "level plus rise" and "descent plus rise".

(vi) Monosyllabic complementary questions have the shortest average duration and a constant pattern of "gentle rise plus steep rise" during the syllable.

It seems, then, that Deme (1962) was right in observing that the falling part of the rise-fall, which does not usually appear in ordinary monosyllabic yes-no questions, may appear in surprised monosyllabic yes-no questions. The second part of his view, however, namely that the rise of ordinary monosyllabic yes-no questions emerged as the direct opposite of the fall of monosyllabic statements, is **phonologically** irrelevant (even if **historically** possible).

From a phonological point of view, the **physically rising** version of ordinary monosyllabic yes-no questions is not a separate melody but an instance of the same rise-fall as the polysyllabic (and **physically rising-falling**) version. This is confirmed, among other things, by the facts of **contour concord**, which we can observe, for example, between the melodies of so called **equivalent blocks** (Varga 2002, 100–2). The sentences of (18) have two intonational phrases each. The first contains the noun phrase *a papagáj* 'the parrot', which has been preposed from F position.[6] The second contains the rest of the sentence: *az csiripel* 'that one twitters', and its F position is occupied by a demonstrative *az* ('that one'), referring to the constituent preposed from F position (*a papagáj*). There is contour concord between the two units: fall and fall in (18a), where the symbol of the fall is [ˋ]; rise and rise in (18b), where the symbol of the rise is [ˊ]; fall-rise and fall-rise in (18c), where the symbol of the fall-rise is [ˇ]; and rise-fall and rise-fall in (18d), where the symbol of the rise-fall is [^]. The vertical bar [|] indicates the boundary between the two intonational phrases.

(18) (a) A ˋpapagáj, | ˋaz csiripel.
'It is the parrot that is twittering.'
(Literally: 'It is the parrot, that's what is twittering.')

(b) És ha a ˊpapagáj, | ˊaz csiripel?
'And [what] if it is the parrot that is twittering?'

(c) A ˇpapagáj, | ˇaz csiripel.
'It is the parrot that is twittering.'

(d) A ^papagáj, | ^az csiripel?
'Is it the parrot that is twittering?'

[6] The F (or focus) position is one of the structural positions of the Hungarian sentence, cf. É. Kiss (1994).

If, in a sentence of similar structure, the second unit is a polysyllabic (i.e., three-or-more syllable) realization of the rise-fall and so obviously rising-falling, **then the monosyllabic initial unit, which physically may be just rising, must also be a realization of the rise-fall**, cf. (19). The word *pinty* means 'chaffinch'.

(19) A ^pinty, | ^az csiripel?
'Is it the chaffinch that is twittering?'

Therefore the best way of phonologically accounting for the melody of the monosyllabic version is to assume, with Grice et al. (2000), that it is the result of truncation. We can offer a truncation rule like (20):

(20) TRUNCATION OF MONOSYLLABIC RISE-FALLS (OPTIONAL)


Rule (20) optionally cuts off the association line of the final L in L*HL, if it is associated with the same syllable as the initial L. As a result, the monosyllabic realization of the rising-falling intonation contour may sound like a rise.

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# PREDICTING HUNGARIAN SOUND DURATIONS FOR CONTINUOUS SPEECH*

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## Abstract

Direct measurements show that a number of factors influence the final value of sound durations in continuous speech. On the segmental level it is mainly the articulatory movements that determine important influence factors, while on the suprasegmental level accent, syllabic stress, within-word position, the preceding and following syllables and finally utterance position may have an influence on final sound durations. So the problem of how to predict sound durations can be described with a multivariable function in which the effect of the variables cannot be easily defined with good accuracy. It is difficult to separate the effects of certain functions, i.e., it is difficult to model this function, making direct measurements on the speech signal.

A model has been constructed and realized in which three well-defined levels are working separately. In the first one (this is the segmental level) the separation of the effect of articulation from other factors is solved. The second and third levels relate to the suprasegmental level of speech.


## 1. Introduction

During speech production the articulatory movements form the frequency and time structure of the speech signal. It is also well known that articulation has an influence on sound duration. Different methods may be used to describe this effect. The use of an articulatory model is described by Shiga et al. (1998) where four time-variable articulatory parameters represent the conditions of articulatory organs whose physical restrictions seem to significantly influence segmental duration.

Measurements showed that, beside the effect of articulatory movements, other factors also influence the value of the duration of a sound. Van Santen (1992) points out that at least eight factors matter in this process: accent,

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syllabic stress, vowel type, prevocalic and postvocalic consonants, within-word position, the preceding and following syllables and finally utterance position.

Earlier measurements of sound durations in Hungarian concern both the inherent time structure of sounds (transient phases, structure of consonants, VOT, etc.) and also the overall duration of sounds. The latter has been examined by Magdics (1966), Kassai (1979), and most recently by Kovács (2002). The inherent time structure of every Hungarian sound has been examined by Olaszy (1991). The first synthesis-controlled measurements for the examination of the structure and duration of Hungarian consonants were made by Olaszy (1985). All four authors gave the results mainly in the form of mean values and main tendencies. These data are somewhat different from what is required for the construction of a duration model. For example, text-to-speech (TTS) conversion requires an adequate duration model for the given language. The construction of that model is complicated by the multitude of phenomena which affect durations in speech (O'Shaughnessy 1981). For this reason researchers try to separate certain factors during their investigations and try to define controlled environments (limited number of words, using nonsense items, placing words or syllables in frame sentences etc.) in which only one changing factor is present at a time. For example, in a study of French vowel and consonant durations, O'Shaughnessy (1981) limited the investigation to stressed syllables in words. Van Santen (1992) used specially created sentence pairs for the investigation of contextual effects on English vowel durations.

The model proposed in this paper gives us the possibility to separate the various effects that influence the creation of sound durations. First, the influence of articulation is taken into consideration (segmental level of speech), secondly, the influence of other factors is discussed. The results of the segmental level part are expressed by specific, articulation-governed sound durations (the duration of every sound as a function of adjacent sounds for continuous speech). These specific duration values are used as a basis for further (word and sentence level) calculations. Thus the prediction of speech sound durations can be performed by the model for the sounds of any text without direct measurements.

### 1.1. State of the art

The modelling of sound durations became increasingly important due to the fast development of speech technology (text-to-speech conversion, speech recognition) in the past few decades. Two main approaches were proposed:

rule-governed and statistical systems. In rule-governed approaches the researchers try to characterize the whole complex process with rules (basically on the linguistic level). The duration of a sound is characterised here by an intrinsic value. In the calculation of the final duration, various phenomena (mainly defined from syntactic information) are taken into consideration and applied on the intrinsic durations.

The statistical approach, on the other hand, uses the results of statistical measurements to predict sound duration. It is difficult to separate definitely the rule-based and the statistical approach. For example, the MITalk TTS system (Allen et al. 1987) is regarded by Zellner (1994) as a statistical system, while van Santen (1998) mentions it as a purely rule-based solution. The MITalk system seems to involve both, because this model is built around average duration, i.e., durations for individual phonemes which represent the result of statistical measurements. The final duration is then calculated after taking the position within a paragraph, the semantic novelty, the phrase structure, etc. into consideration.

In a more recent approach, Campbell (1992) proposed another type of determination of sound durations. According to this, first the higher level syllable durations have to be calculated to reflect the rhythmic and structural organisation of the utterance and the durations of the sounds in the syllable are calculated from the syllable durations.

One common feature of all these approaches is that the duration data and rules are derived from natural speech material. The disadvantage of these methods is that the measured duration values contain the effect of more than one feature in many cases. Moreover, the generality of the results may be restricted by the influence of individual pronunciation (van Santen 1998).

### 1.2. Hypothesis

The hypothesis was that the surface level final durations can be built from low level basic structures. The concept follows the theoretical separation of speech into segmental and suprasegmental levels. Segmental level durations represent the basis (speech without prosody but having the correct specific duration values of the sounds, the distribution of durations, the correct, language specific timing ratios among speech sounds). At this level only the articulation has an effect on sound durations. We assume that data on this level can give the basis for the further calculations (modifications of the specific durations) which are determined on the suprasegmental (surface) level.

## 2. The method used

In this paper we describe an inverse (bottom-up) method to define the final, surface level sound durations. Sound durations are determined in three steps in this model.

1. The most important part of the whole procedure is the indirect measuring method that is applied to determine the specific durations: $(t)spec$. Their value varies only as a function of articulation. The indirect measuring method means that the duration values are not defined by measuring the sound durations in natural speech, but by using the combination of segmental level speech synthesis and perceptual evaluations. Thus the specific sound durations characteristic of continuous speech (taking the effects of the continuous serial articulation process into consideration) will be determined in milliseconds (for a certain articulation rate).

2. The second step is based on the results of step (1) and the modification factors defined are derived from the words as building units of speech. Word level modification rules have been formulated which showed to what extent the specific duration of the sounds has to be lengthened or shortened within the word (in continuous speech). The result of this step is a modification factor (M1) for every sound of the word. M1 is defined by the following variables: the length of the word and the sound map of the word (which sounds and sound combinations are in the word, and what is the sound order). All sounds of the word are supplied with M1. The series of these numbers is called **word level duration map**.

3. The third (suprasegmental) level of the model represents the final adjustment of the sound durations. The second modification factor (M2) is defined by **sentence level** rules (modality, phrase structure, prominence etc.).

The final sound durations (individually for every sound of the utterance as a function of the adjacent sounds) are then calculated in the following way:

$$(t)final = (t)spec \times \mathrm{M1} \times \mathrm{M2}$$

As a result of the three steps the final sound durations of every sound in the utterance will be defined.

The experimental setup for getting specific durations was organized around a **segmental level** TTS synthesizer, a perceptual evaluation procedure and a sound duration modifier (Figure 1).

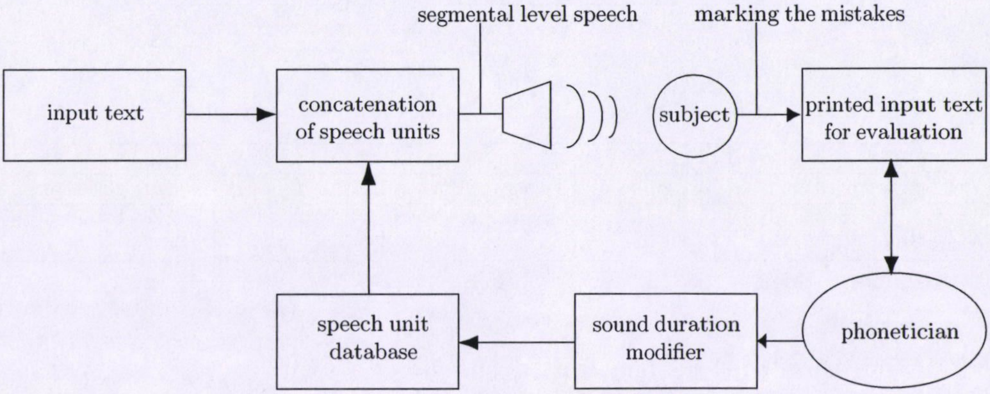


*Fig. 1*
The test environment for the adjustment of specific sound durations

The TTS synthesizer consists of a speech unit database (waveform elements derived from human pronunciation) a concatenation module, a grapheme–sound converter and a sound duration modifier. This synthesizer produced the speech (withouth melody and accent) for the perceptual evaluation. The design and realization of this synthesizer was one of the most complicated elements in setting up the test environment. The steps of realization were as follows: (a) determination of the speech sound set for the TTS conversion; (b) definition of the form of the elements of the speech unit database for concatenation; (c) designing the text corpus for the creation of the elements of the speech unit database; (d) the realization of the speech unit database.

## 2.1. Speech sound set and its representation in the experiment

The goal of the experiment was to measure the duration of the 9 basic vowels (7 short ones plus long [aː] and [eː]) and the 23 short consonants of Hungarian (Table 1, Table 2). The symbols of the third rows of the tables represent the appropriate character for the given sound in the representation of computer programs. These characters will be used in computer generated tables and figures. The characters of the third rows will be written between brackets like (a), (A), (u), (U) when referring to a Hungarian speech sound. The phonetic symbols of sounds will be written as: [ɔ], [aː], [o], etc.

*Table 1*

The basic Hungarian vowels used in the experiment

| IPA symbol | aː | ɔ | o | u | y | i | eː | ø | ɛ |
|---|---|---|---|---|---|---|---|---|---|
| written form | á | a | o | u | ü | i | é | ö | e |
| symbol in this experiment | A | a | o | u | U | i | E | O | e |

*Table 2*

The basic Hungarian consonants used in the experiment

| IPA symbol | b | p | d | t | g | k | ɟ | c | m | n | ɲ | j | h | v | f | z | s | ʦ | ʒ | ʃ | ʧ | l | r |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| written form | b | p | d | t | g | k | gy | ty | m | n | ny | j | h | v | f | z | sz | c | zs | s | cs | l | r |
| symbol in this experiment | b | p | d | t | g | k | G | T | m | n | N | j | h | v | f | z | s | c | Z | S | C | l | r |

## 2.2. Definition and realisation of the speech unit inventory for synthesis

The goal of the definition of the form of speech units was to produce good quality speech (close to natural voice timbre) by the synthesizer. Thus the sound quality will influence the listeners in their duration evaluation to a lesser extent. As the ultimate goal was to define the duration of a sound taking the effect of the adjacent sounds into account, theoretically C**V**C, V**C**V, C**C**V, VC**C**, **V**VC and CV**V** elements could have been used as building units. As perceptual experiments showed that listeners are more sensitive to duration failures in vowels than in consonants (Kato et al. 1998), we treated vowel duration as the most important kind of data, especially in CVC combinations. Our latest measurements showed that this combination type occurs most frequently in Hungarian (80% of the triphone units are of a CVC structure, measured in a corpus of 2 million different word forms). The duration of the vowel can be determined the most correctly if the vowel is treated during the synthesis as an individual element influenced only by the actual surrounding consonants, i.e., every vowel in every C**V**C combination has its own specific duration and this duration value represents the duration of the vowel only in the given C**V**C combination. If we take into account the fact that the given vowel may be preceded by any consonant and may be followed also by any one, theoretically the effect of articulation of adjacent consonants on the duration of any vowel can be defined by four cases as indicated in Table 3.

The final decision was to use triphone C**V**C elements in the speech unit inventory to ensure the possibility of most precise adjustment for vowels in

*Table 3*

The theoretical effect of consonants on vowel duration in CVC sequences

| PRECEDING CONSONANT | | FOLLOWING CONSONANT | | THE FINAL DURATION OF THE VOWEL |
|---|---|---|---|---|
| lengthening the vowel | shortening the vowel | lengthening the vowel | shortening the vowel | |
| + | | + | | lengthened (doubled lengthening influence) |
| + | | | − | equalized (not changed) |
| | − | | − | shortened (doubled shortening influence) |
| | − | + | | equalized (not changed) |

CVC combinations during the perceptual evaluations. This fact defined the final content of the speech unit database: vowels in CVC combinations were generated form CVC triphones, all other sound combinations were generated using the concatenation of CV, VC, VV, and CC diphones. One triphone element contained two half consonants and the vowel between them. One diphone element contained two half speech sounds (e.g., a CV unit has the second part of the C and the first half of the V). The speech unit database was planned to have 4761 CVC triphones, 207 CV, 207 VC, 81 VV and 529 CC diphones.

## 2.3. The criteria for the creation of the speech unit database

The elements of the speech unit database were created from human voice items. A text corpus had been designed which was read by a male announcer. Three aims were kept in mind when designing the text corpus: (a) to keep the correct formant structure in vowels (mainly in CV, VC and VV diphones; (b) to reduce the effect of suprasegmental factors (accent, rhythm, melody, etc.); and (c) to have controlling possibilities for keeping sound intensity close to a constant value during the recording.

To meet these requirements three-syllable meaningless text items were defined for the announcer.

An example of the meaningless text items containing the vowel (o) for CVC triphone units, where the vowel was preceded by the consonant [b] and followed by all consonants looked like this: ***aboba*** [ɔ**bob**ɔ], ***abopa*** [ɔ**bop**ɔ], ***aboda*** [ɔ**bod**ɔ], ***abota*** [ɔ**bot**ɔ], ***aboga*** [ɔ**bog**ɔ], ***aboka*** [ɔ**bok**ɔ], ..., ***aboma*** [ɔ**bom**ɔ], ***abona*** [ɔ**bon**ɔ], etc.

The text items for the production of the CV, VC and VV diphones were designed using a well known phonetic rule. The problem in diphone representation is that vowels are cut at their middle point. When generating a vowel in the synthesis process with the concatenation of two diphones, spectral discontinuities may occur in the formant structure of the vowel at the point of concatenation. This produces distortion. To reduce these distortions the formants of vowels were controlled by phonetic means to reach an optimal steady state position at the concatenation point for both CV and VC diphones. The [k] sound was used for this purpose because this sound is the most flexible as to its articulation and it does not influence the formant structure either of the preceding (in a VC combination) or of the following vowel (CV) very much. In items for CV diphones the [k] sound follows the vowel, i.e., the formants of the vowel will be close to the steady state values at the second half of the vowel where the cut will be done. Examples of the meaningless text items containing CV diphone elements are: *a**bo**ka* [ɔ**bo**kɔ], *a**po**ka* [ɔ**po**kɔ], *a**do**ka* [ɔ**do**kɔ], *a**to**ka* [ɔ**to**kɔ] ...; and for VC elements: *ak**ob**a* [ɔk**ob**ɔ], *ak**op**a* [ɔk**op**ɔ], *ak**od**a* [ɔk**od**ɔ], *ak**ot**a* [ɔk**ot**ɔ]. In items for VC diphones the [k] sound precedes the vowel, i.e., the formants of the vowel will be close to the steady state values in the first half of the vowel where the cut will be done. Thus it can be assumed that the discontinuity in formants will be low and by concatenating these diphones, the formant frequencies at the concatenation point will be close to each other, therefore spectral distortion will be minimal.

For the production of CC diphones, words containing the given sequence were mostly given in the text list.

The structure of the text corpus described above solved two other problems, too. It was possible not to have accent on the triphone or on the diphone element (in Hungarian the accent is on the first syllable of the pronounced word) and, with the use of [ɔ] in the first and in the last syllable, the sound intensity level became controllable (the demand was to keep it constant as far as it can be during the recording).

## 2.4. Realization of the speech unit database

The text material was read by a trained male speaker in a monotonous style (keeping the fundamental frequency as constant as it was possible) but with normal speech rate. The digital representation (22 kHz, 16 bit) of the wave form was labelled on sound boundaries (semi-automatically) and pitch synchronisation markers were placed too (semi-automatically). It is obvious that the correctness of any sound duration measurement strongly depends on the definition of sound boundaries in the measurable waveform. In our case a phonetician labelled the sound boundaries manually (with visual and auditive control). Visual observations concerned the waveform and the intensity curve of the signal. In some special cases a spectrographic analysis was also used to define the sound boundary. The flexible "play the sound window" option made the auditive control more effective, i.e., the acoustic change in the sound could be heard by adding, step by step, one more period to the previously selected and played part of the window. All these supports were given by the Hungarian Profivox Development System (PDS) software tool (Olaszy et al. 2001). For vowels in CVC combinations the onset and offset were determined mostly very correctly (consonantal aspiration was not involved). In VV combinations, the auditive examination gave the most important help to determine the boundary. In the case of sonorant–vowel combinations, the analysis of the intensity curve and the auditive examination gave the desired result.

The speech unit database was created by a semi-automatic method. The cut points for CVC elements were defined at the middle of the consonants, and for diphone elements at the middle of the sounds. This database contained individual vowel durations for every CVC combination type and created durations for all other sounds in all combinations. Created duration means that the duration of the sound will be defined by the two diphones used actually.

### 2.5. The perceptual evaluation

The determination of specific durations was carried out by a multi-step, long-lasting perceptual evaluation (Figure 1). It represented a closed circuit sound duration evaluation and correction procedure. The TTS produced the voice (without suprasegmental structure) from the input text. Two types of input text were used: a basic and a general text material. The basic one consisted of 1200 sentences, (5–10 words in a sentence). The general one contained texts from newspapers, books and scientific articles. The printed form of all these text materials served for marking the results of the duration evaluation.

Four subjects of normal hearing (one female and three males, ages between 30 and 50) completed the whole test. The whole perceptual evaluation and duration correction procedure lasted for eight months. The listening was arranged always for one subject at a time. One listening session lasted for max. 30 minutes, and about 50 sentences were evaluated. The articulation speed of the synthetic speech was 12–13 sounds/s, this corresponds to a medium speaking rate in Hungarian (Kovács 2002).

The steps of the perceptual evaluation were as follow:

1. The subject was asked to listen to the synthesised text sentence by sentence. He/she had to evaluate the duration of the sounds of the given sentence, and to mark with the predefined marker on the printed text those sounds the duration of which was heard to be too long (–) or too short (∗). Using a repeat function the previous sentence could be listened to several times if required. An evaluated sentence showed, for example, the following picture:

(1) A tervezett tárgyalás után levelet írok a külföldi partnernek.
∗ – – ∗ – – ∗ – ∗ –
'After the planned discussion I will write a letter to the foreign partner.'

The markers in the example show that there was one too short part at the beginning of the first word, one longer vowel was found in the second word, and so on.

2. A phonetician took part in the test, too. He controlled the marked judgments of the subjects. In cases of 3 or 4 identical opinions for the same sound he accepted the opinion and made the lengthening or shortening according to his own decision and perceptual judgement. In cases of only 2 corresponding opinions he did not make any correction. The duration change was set in the given part of the triphone or diphone in question. Thus the speech unit database contained more and more closely correct durations. After making all corrections the listeners were asked (2–3 weeks later) to make the evaluation (points 1 and 2) once more for the whole text. A special, sound duration modifier program (Olaszy–Olaszi 1998) helped the phonetician to make the corrections.

   Going ahead in the evaluation procedure, more and more sounds reached their correct, segmental level, specific duration characteristic for continuous speech. The subjects were able to mark the mistakes in durations more and more precisely. Already the experiments of Huggins (1972) had shown that listeners can perceive very small changes in duration. In this experiment the sensitivity of the listeners reached the 10 ms value in the final phase. The test procedure was done altogether four times with the four subjects.

3. After this phase, ordinary texts (from newspapers, articles, weather forecast, etc.) were synthesised by the system (without prosody parameters) and sound duration values were tested the same way as in points 1 and 2. Such texts automatically contain the language specific

occurrence ratios of segmental units. So, the duration of the most frequent sounds in the most frequent sound combinations was evaluated and corrected (if needed) once again.

4. After the whole procedure the segmental level speech (produced by the final speech unit database) was very balanced from the point of view of correct sound duration values in continuous speech. The produced synthetic speech (without prosody) was fluent, and clearly understandable. This database was then declared to be the reference database that incorporates the specific sound duration values (for all sound combinations) involving the influence of articulation on duration. These duration values are characteristic of Hungarian speech production and can serve as a stable basis for further calculation of final durations on the suprasegmental level.

## 3. Results and criticism

The goal of the whole procedure was not only to determine the segmental level sound durations, but also to prove the correctness of this new indirect procedure and the results obtained. Therefore, besides the definition of specific sound durations, distribution measurements have been performed to study the data produced by the first level of the model. The aim of these distribution measurements was to get an overview (on data level) about the behaviour of specific sound durations in different sound combinations. The data have been compared with earlier results (derived from direct duration measurements by Kassai (1979) and Magdics (1966)). It was assumed that, if these new results correlate with earlier results, the method presented can be accepted as an objective procedure for the definition of the segmental level, specific, articulation-governed sound duration structure of a language.

### 3.1. Vowels in C*V*C combinations

The results contain duration values for nine vowels in 4761 different combinations. The data are presented in the form of matrices for every vowel. A sample matrix for the sound (o) is given in Table 4. The table shows the specific duration values of (**o**) in all CVC combinations. The leftmost column of the matrix represents the preceding C, the top row the following C. The target vowel (**o**) is shown at the upper left corner of the matrix. So if we want to get the specific duration of (**o**) in the sequence *boldog* [boldog] 'happy' we take the row of **(b)** and the column of **(l)**. The result is 84 ms for the given articulation rate. For the second **(o)** we take the row of **(d)** and the column of **(g)**. The result is 91 ms.

*Table 4*

The specific durations of (o) in CVC combinations in ms for continuous speech

| **o** | **b** | **p** | **d** | **t** | **g** | **k** | **G** | **T** | **m** | **n** | **N** | **j** | **h** | **V** | **f** | **z** | **s** | **c** | **Z** | **S** | **C** | **l** | **r** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **b** | 88 | 93 | 84 | 95 | 93 | 90 | 93 | 103 | 83 | 84 | 94 | 95 | 95 | 85 | 94 | 93 | 90 | 94 | 94 | 85 | 83 | 84 | 94 |
| **p** | 88 | 93 | 83 | 95 | 92 | 90 | 92 | 103 | 82 | 83 | 93 | 95 | 95 | 84 | 93 | 93 | 90 | 94 | 94 | 84 | 83 | 83 | 93 |
| **d** | 86 | 91 | 82 | 93 | 91 | 88 | 91 | 101 | 81 | 81 | 92 | 93 | 93 | 83 | 91 | 91 | 88 | 92 | 92 | 83 | 81 | 82 | 92 |
| **t** | 84 | 90 | 80 | 92 | 89 | 86 | 89 | 100 | 79 | 80 | 90 | 92 | 92 | 81 | 90 | 90 | 87 | 91 | 91 | 81 | 80 | 80 | 90 |
| **g** | 87 | 92 | 83 | 94 | 92 | 89 | 92 | 102 | 82 | 82 | 93 | 94 | 94 | 84 | 92 | 92 | 89 | 93 | 93 | 84 | 82 | 83 | 93 |
| **k** | 79 | 84 | 75 | 86 | 84 | 81 | 84 | 94 | 74 | 74 | 85 | 86 | 86 | 76 | 84 | 84 | 81 | 85 | 85 | 76 | 74 | 75 | 85 |
| **G** | 90 | 95 | 85 | 97 | 94 | 92 | 94 | 105 | 84 | 85 | 95 | 97 | 97 | 86 | 95 | 95 | 92 | 96 | 96 | 86 | 85 | 85 | 95 |
| **T** | 99 | 104 | 95 | 106 | 104 | 101 | 104 | 115 | 94 | 95 | 105 | 106 | 106 | 96 | 105 | 105 | 101 | 106 | 106 | 96 | 95 | 95 | 105 |
| **m** | 79 | 85 | 75 | 87 | 84 | 81 | 84 | 95 | 74 | 75 | 85 | 86 | 86 | 76 | 85 | 85 | 81 | 86 | 86 | 76 | 75 | 75 | 85 |
| **n** | 90 | 96 | 86 | 98 | 95 | 92 | 95 | 106 | 85 | 86 | 96 | 98 | 98 | 87 | 96 | 96 | 93 | 97 | 97 | 87 | 86 | 86 | 96 |
| **N** | 94 | 99 | 90 | 101 | 99 | 96 | 99 | 109 | 89 | 90 | 100 | 101 | 101 | 91 | 100 | 99 | 96 | 100 | 100 | 91 | 89 | 90 | 100 |
| **j** | 80 | 86 | 76 | 88 | 85 | 82 | 85 | 96 | 75 | 76 | 86 | 87 | 87 | 77 | 86 | 86 | 82 | 87 | 87 | 77 | 76 | 76 | 86 |
| **h** | 90 | 96 | 86 | 98 | 95 | 92 | 95 | 106 | 85 | 86 | 96 | 98 | 98 | 87 | 96 | 96 | 93 | 97 | 97 | 87 | 86 | 86 | 96 |
| **v** | 88 | 94 | 84 | 96 | 93 | 90 | 93 | 104 | 83 | 84 | 94 | 96 | 96 | 85 | 94 | 94 | 91 | 95 | 95 | 85 | 84 | 84 | 94 |
| **f** | 80 | 86 | 76 | 88 | 85 | 82 | 85 | 96 | 75 | 76 | 86 | 88 | 88 | 77 | 86 | 86 | 83 | 87 | 87 | 77 | 76 | 76 | 86 |
| **z** | 91 | 96 | 87 | 98 | 96 | 93 | 96 | 106 | 86 | 86 | 97 | 98 | 98 | 88 | 96 | 96 | 93 | 97 | 97 | 88 | 86 | 87 | 97 |
| **s** | 87 | 92 | 83 | 94 | 92 | 89 | 92 | 103 | 82 | 83 | 93 | 94 | 94 | 84 | 93 | 93 | 89 | 94 | 94 | 84 | 83 | 83 | 93 |
| **c** | 93 | 98 | 88 | 100 | 97 | 95 | 97 | 108 | 87 | 88 | 98 | 100 | 100 | 89 | 98 | 98 | 95 | 99 | 99 | 89 | 88 | 88 | 98 |
| **Z** | 87 | 92 | 82 | 94 | 91 | 89 | 91 | 102 | 81 | 82 | 92 | 94 | 94 | 83 | 92 | 92 | 89 | 93 | 93 | 83 | 82 | 82 | 92 |
| **S** | 77 | 83 | 73 | 85 | 82 | 79 | 82 | 93 | 72 | 73 | 83 | 85 | 85 | 74 | 83 | 83 | 80 | 84 | 84 | 74 | 73 | 73 | 83 |
| **C** | 88 | 94 | 84 | 96 | 93 | 90 | 93 | 104 | 83 | 84 | 94 | 95 | 95 | 85 | 94 | 94 | 90 | 95 | 95 | 85 | 84 | 84 | 94 |
| **l** | 80 | 85 | 76 | 87 | 85 | 82 | 85 | 95 | 75 | 75 | 86 | 87 | 87 | 77 | 85 | 85 | 82 | 86 | 86 | 77 | 75 | 76 | 86 |
| **r** | 89 | 95 | 85 | 97 | 94 | 91 | 94 | 105 | 84 | 85 | 95 | 97 | 97 | 86 | 95 | 95 | 92 | 96 | 96 | 86 | 85 | 85 | 95 |

The duration data in Table 4 contain the effect of articulation on the duration of (o) in CVC combinations. The mean duration calculated from these data for (o) is 90 ms. The minimal duration is 72 ms, the maximum is 115 ms. The distribution of duration values as a function of CVC combinations is shown in Table 5. The diverse duration values for (o) can be summarised into four 10 ms groups, i.e., CVC elements where the duration is between 70 and 79 ms, 80–89, 90–99, 100–109 ms. The duration exceeds 110 ms only in the (ToT) combination. This distribution shows that the duration of (o) is the longest in the neighbourhood of palatals and it is the shortest in the neighbourhood of nasals and (S).

The summarised mean specific duration values of the 7 short and two long Hungarian vowels are given in Table 6 (page 334) and in Figure 2 (page 335). Vowel order data obtained with this inverse method correlate with earlier results of Kassai (1979) who gave the duration order of short vowels in accented position as: [i] < [u] < [y] < [o] < [ɛ] < [ɔ] < [ø] (where the '<' sign means 'shorter than'). The present data give the same vowel order.

*Table 5*

The distribution of specific durations of (o) in CVC combinations

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **70-ms** | Tom | toC | kob | kod | kom | kon | kov | KoS | koC | kol | mob | mod | mom | mon | mov | moS | moC | mol | jod | jom | |
| | Jon | jov | joS | joC | jol | fod | fom | Fon | fov | foS | foC | fol | Sob | Sod | Sok | Som | Son | Sov | Sos | SoS | SoC |
| | Sol | lob | lod | lom | lon | lov | loS | loC | lol | | | | | | | | | | | | |
| **80-** | Bob | bod | bok | bom | bon | bov | boS | boC | bol | pob | pod | pok | pom | pon | pov | pos | poS | poC | pol | dob | |
| | Dod | dok | dom | don | dov | dos | doS | doC | dol | tob | top | tod | tog | tok | toG | ton | tov | tof | toz | tos | ToS |
| | Tol | gob | god | gok | gom | gon | gov | gos | goS | goC | gol | kop | kot | kog | kok | koG | koN | koj | koh | kof | Koz |
| | Kos | koc | koZ | kor | Gob | God | Gom | Gon | Gov | GoS | GoC | Gol | mop | mot | mog | mok | moG | moN | moj | moh | Mof |
| | Moz | mos | moc | moZ | mor | nod | nom | non | nov | noS | noC | nol | Nod | Nom | Non | NoC | Nol | job | jop | jot | Jog |
| | Jok | joG | joN | joj | joh | jof | joz | jos | joc | joZ | jor | hod | hom | hon | hov | hoS | hoC | hol | vob | vod | vom |
| | Von | vov | voS | voC | vol | fob | fop | fot | fog | fok | foG | foN | Foj | foh | fof | foz | fos | foc | foZ | for | zod |
| | Zom | zon | zov | zoS | zoC | zol | sob | sod | sok | som | son | sov | sos | soS | soC | sol | cod | com | con | cov | coS |
| | CoC | col | Zob | Zod | Zok | Zom | Zon | Zov | Zos | ZoS | ZoC | Zol | Sop | Sot | Sog | SoG | SoN | Soj | Soh | Sof | Soz |
| | Soc | SoZ | Sor | Cob | Cod | Com | Con | Cov | CoS | CoC | Col | lop | lot | log | lok | loG | loN | loj | loh | lof | loz |
| | Los | loc | loZ | lor | rob | rod | rom | ron | rov | roS | roC | rol | | | | | | | | | |
| **90-** | Bop | bot | bog | boG | boN | boj | boh | bof | boz | bos | boc | boZ | bor | pop | pot | pog | poG | poN | poj | poh | |
| | Pof | poz | poc | poZ | por | dop | dot | dog | doG | doN | doj | doh | dof | doz | doc | doZ | dor | tot | toT | toN | toj |
| | Toh | toc | toZ | tor | gop | got | gog | goG | goN | goj | goh | gof | goz | goc | goZ | gor | koT | Gop | Got | Gog | Gok |
| | GoG | GoN | Goj | Goh | Gof | Goz | Gos | Goc | GoZ | Gor | Tob | Tod | Tom | Ton | Tov | ToS | ToC | Tol | moT | nob | nop |
| | Not | nog | nok | noG | noN | noj | noh | nof | noz | nos | noc | noZ | nor | Nob | Nop | Nog | Nok | NoG | NoN | Nov | Nof |
| | Noz | Nos | NoS | Nor | joT | hob | hop | hot | hog | hok | hoG | hoN | hoj | hoh | hof | hoz | hos | hoc | hoZ | hor | vop |
| | Vot | vog | vok | voG | voN | voj | voh | vof | voz | vos | voc | voZ | vor | foT | zob | zop | zot | zog | zok | zoG | zoN |
| | Zoj | zoh | zof | zoz | zos | zoc | zoZ | zor | sop | sot | sog | soG | soN | soj | soh | sof | soz | soc | soZ | sor | cob |
| | Cop | cot | cog | cok | coG | coN | coj | coh | cof | coz | cos | coc | coZ | cor | Zop | Zot | Zog | ZoG | ZoN | Zoj | Zoh |
| | Zof | Zoz | Zoc | ZoZ | Zor | SoT | Cop | Cot | Cog | Cok | CoG | CoN | Coj | Coh | Cof | Coz | Cos | Coc | CoZ | Cor | loT |
| | Rop | rot | rog | rok | roG | roN | roj | roh | rof | roz | ros | roc | roZ | ror | | | | | | | |
| **100-** | BoT | poT | doT | goT | GoT | Top | Tot | Tog | Tok | ToG | ToN | Toj | Toh | Tof | Toz | Tos | Toc | ToZ | Tor | noT | |
| | Not | NoT | Noj | Noh | Noc | NoZ | hoT | voT | zoT | soT | coT | ZoT | CoT | roT | | | | | | | |
| **110-** | ToT | | | | | | | | | | | | | | | | | | | | |

As we look at the situation in other languages, similar results were reported by O'Shaughnessy (1981) for French vowels in closed syllables, where the shortest vowels were the high ones [i, u], the mid vowel [e] was longer and the low vowel [a] was found to be the longest. Measured data for English (van Santen 1992) follow the same order both in stressed and in unstressed position. Thus the correlation between the duration and the height of the tongue during articulation is involved in our indirectly measured data as well.

For the two long vowels examined, our results also correlate with those of Kassai, i.e., the sound [eː] is shorter than [aː]. The distribution of short vowels ranges from 55 ms to 195 ms according to Kassai, the present results are 61–115 ms. The latter difference can be explained by the fact that Kassai measured the data from complex speech (with normal rhythm, accent, etc.), but now we derived them from a segmental level signal where the distribution is obviously narrower.

*Table 6*

Specific duration values determined for Hungarian vowels in ms for continuous speech

| vowel | (i) [i] | (u) [u] | (U) [y] | (o) [o] | (a) [ɔ] | (e) [ɛ] | (O) [ø] | (E) [eː] | (A) [aː] |
|---|---|---|---|---|---|---|---|---|---|
| Mean | 80 | 86 | 86 | 90 | 91 | 91 | 92 | 146 | 164 |
| Min. | 61 | 69 | 61 | 72 | 73 | 64 | 71 | 124 | 128 |
| Max. | 99 | 113 | 103 | 115 | 113 | 115 | 109 | 170 | 196 |

The average duration of all vowels is 102 ms. For English van Santen (1992) defines this value as 106 ms. The average of all short vowels for Hungarian is 88 ms, while van Santen gives the average duration data for English /i/ and /ʌ/ as 80 and 88 ms, respectively. However, at some points the present results do not correlate with Kassai's measurements: we found that the duration of a vowel is not lengthened by the following (l), (r) sounds. Furthermore, our data do not support the finding that the duration of the vowel is consistently longer before voiced consonants than before voiceless ones.

## 3.2. Consonants in V*C*V combinations

For all consonants in all VCV combinations 1863 specific duration values were defined in 23 matrices. A sample matrix for the sound (b) is shown in Table 7 (page 336) where the duration values of (b) are given in milliseconds in all VCV combinations. The leftmost column of the matrix represents the preceding V, the top row the following one. The target consonant (b) is shown at the upper left corner of the matrix.

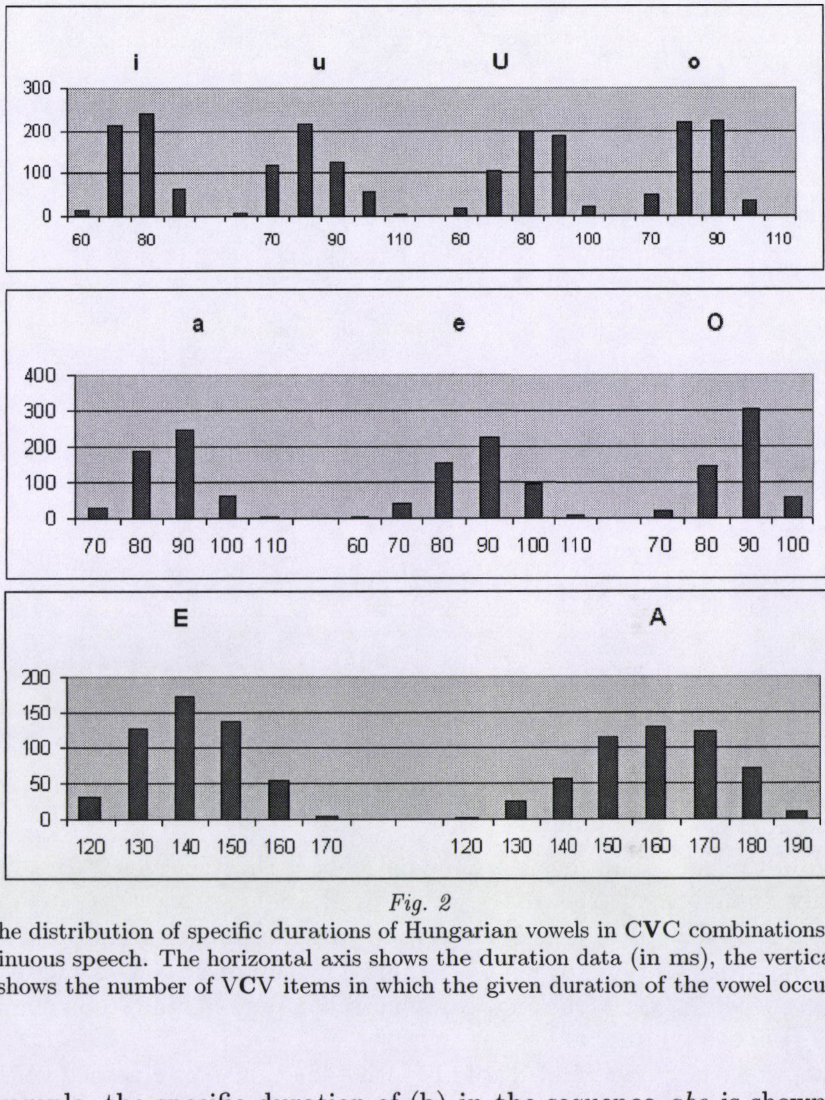


*Fig. 2*

The distribution of specific durations of Hungarian vowels in C**V**C combinations for continuous speech. The horizontal axis shows the duration data (in ms), the vertical axis shows the number of V**C**V items in which the given duration of the vowel occurs

For example, the specific duration of (b) in the sequence *abe* is shown at the cross-point of the row of **(a)** and the column of **(e)**. The result is 62 ms for the given articulation rate. The minimum duration for (b) is 55 ms, the maximum is 78 ms. The duration distribution for (b) can be arranged into three 10 ms groups: 50–59, 60–69 and 70–79 ms. The majority of cases (55) are in the 60–69 ms area. The overall distribution for all stop consonants is shown in Figure 3 (overleaf). The horizontal axis shows the duration groups in milliseconds, the vertical axis shows the number of V**C**V items in which the

*Table 7*

The specific durations for (b) in VCV combinations in ms for continuous speech

| b | A | a | o | u | U | i | E | O | e |
|---|---|---|---|---|---|---|---|---|---|
| A | 61 | 63 | 63 | 56 | 66 | 68 | 66 | 57 | 61 |
| a | 62 | 64 | 64 | 57 | 67 | 70 | 67 | 58 | 62 |
| o | 67 | 69 | 69 | 62 | 72 | 75 | 72 | 63 | 67 |
| u | 70 | 72 | 72 | 65 | 75 | 78 | 75 | 66 | 70 |
| U | 61 | 63 | 63 | 56 | 66 | 69 | 66 | 57 | 61 |
| i | 67 | 69 | 69 | 62 | 72 | 75 | 72 | 63 | 67 |
| E | 60 | 62 | 62 | 55 | 65 | 68 | 65 | 56 | 60 |
| O | 60 | 62 | 62 | 55 | 66 | 68 | 65 | 56 | 60 |
| e | 69 | 71 | 71 | 64 | 74 | 76 | 74 | 65 | 69 |

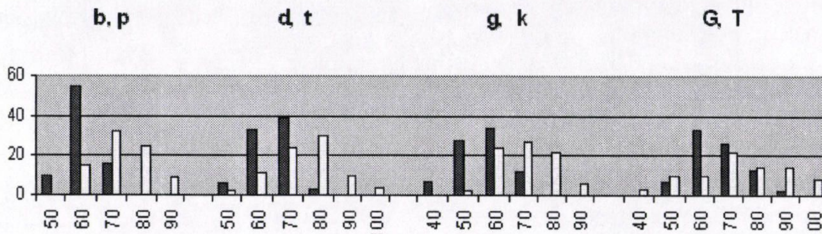


*Fig. 3*
The distribution of the specific duration of Hungarian voiceless stops (white) and voiced ones (dark) in VCV combinations for continuous speech

duration of the consonant occurs. The data show that voiceless stops (white) are longer than voiced ones (dark).

The distribution of voiceless stops shows a wider range than that of voiced ones. Comparing these data with the duration values of vowels in Figure 2, they show a wider distribution. Summarised values for all consonants are given in Table 8 in ms.

Comparing the results of Table 8 with the results of Kassai (1979) and Olaszy (1985), the order of the mean values of consonants coincides. Kassai gave the length order as: liquids < nasals < voiced stops < voiced fricatives < voiceless stops < voiceless fricatives < voiceless affricates. If we follow this order, the data from Olaszy (1985) are: 45, 67, 69, 65, 117, 120, 125 ms, and the present data are: 44, 61, 66, 65, 76, 79, 95 ms. The difference between the data from 1985 and now can be explained with the material of the experiment.

*Table 8*

The specific duration values in ms for consonants in V**C**V positions for continuous speech

| C | (b) [b] | (p) [p] | (d) [d] | (t) [t] | (g) [g] | (k) [k] | (G) [ɟ] | (T) [c] |
|---|---|---|---|---|---|---|---|---|
| Mean | 65 | 77 | 70 | 76 | 62 | 74 | 68 | 76 |
| Min. | 55 | 61 | 53 | 61 | 47 | 59 | 53 | 47 |
| Max. | 78 | 94 | 80 | 96 | 78 | 92 | 87 | 88 |
| C | (m) [m] | (n) [n] | (N) [ɲ] | (j) [j] | (h) [h] | (v) [v] | (f) [f] | (z) [z] |
| Mean | 67 | 48 | 66 | 59 | 62 | 61 | 85 | 68 |
| Min. | 51 | 36 | 45 | 36 | 42 | 36 | 69 | 57 |
| Max. | 82 | 64 | 88 | 102 | 82 | 76 | 96 | 76 |
| C | (s) [s] | (c) [ʦ] | (Z) [ʒ] | (S) [ʃ] | (C) [ʧ] | (l) [l] | (r) [r] | |
| Mean | 82 | 92 | 67 | 83 | 98 | 52 | 37 | |
| Min. | 62 | 77 | 46 | 76 | 77 | 37 | 18 | |
| Max. | 103 | 106 | 82 | 100 | 112 | 68 | 46 | |

Olaszy (1985) measured the data mainly in two-syllable words, the present data were defined for continuous speech.

The average duration for all consonants in V**C**V position ranges from 37 ms to 98 ms.

### 3.3. Consonants in V*C*C and C*C*V combinations

Consonant clusters were examined only in V**C**C and in C**C**V combinations where the duration of the C in the middle position was defined. The results contain 2×4761 specific duration values for the 23 consonants for both types of combinations. The matrix for the sound (b) in V**C**C combinations is shown in Table 9. Table 10 shows the specific durations of (b) in C**C**V combinations.

Comparing the data with the durations of (b) in C**V**C combinations (Table 7) the conclusion is that the duration of (b) is longer in V**C**C and C**C**V combinations than in V**C**V position. The effect of articulation can be seen, for example, in the **(m)** column in Table 9, where the duration of (b) is shorter than in other columns. The same is the case in the **(m)** row of Table 10. This shorter duration of (b) in the (b)(m) and (m)(b) combinations may be explained by the fact that (b) loses its burst in this V**C**C combination because of the identical bilabial articulation of the two consonants. In the C**C**V combination mentioned, the voiced stop portion of (b) is shorter because of

*Table 9*

The specific durations for (b) in VCC combinations in ms, for continuous speech

| **b** | **b** | **p** | **d** | **t** | **g** | **k** | G | T | **m** | **n** | **N** | **j** | **h** | **v** | **f** | **z** | **S** | **c** | **Z** | **S** | **C** | **l** | **r** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **A** | 87 | 79 | 71 | 78 | 78 | 76 | 80 | 69 | 59 | 71 | 89 | 69 | 79 | 68 | 69 | 68 | 76 | 89 | 76 | 79 | 73 | 67 | 79 |
| **a** | 88 | 80 | 72 | 80 | 79 | 77 | 81 | 70 | 60 | 72 | 90 | 70 | 80 | 69 | 70 | 70 | 77 | 90 | 77 | 80 | 74 | 68 | 80 |
| **o** | 93 | 85 | 77 | 85 | 84 | 82 | 86 | 75 | 61 | 77 | 95 | 75 | 85 | 68 | 71 | 75 | 82 | 95 | 82 | 85 | 79 | 73 | 85 |
| **u** | 96 | 88 | 80 | 88 | 87 | 85 | 89 | 78 | 62 | 80 | 98 | 78 | 88 | 68 | 70 | 78 | 85 | 98 | 85 | 88 | 82 | 76 | 88 |
| **U** | 87 | 79 | 71 | 79 | 78 | 76 | 80 | 69 | 59 | 71 | 89 | 69 | 79 | 69 | 69 | 69 | 76 | 89 | 76 | 79 | 73 | 67 | 79 |
| **i** | 93 | 85 | 77 | 85 | 84 | 82 | 86 | 75 | 60 | 77 | 95 | 75 | 85 | 65 | 70 | 75 | 82 | 95 | 82 | 85 | 79 | 73 | 85 |
| **E** | 86 | 78 | 70 | 78 | 77 | 75 | 79 | 68 | 58 | 70 | 88 | 68 | 78 | 68 | 68 | 68 | 75 | 88 | 75 | 78 | 72 | 66 | 78 |
| **O** | 86 | 78 | 70 | 78 | 77 | 75 | 79 | 68 | 58 | 71 | 88 | 68 | 78 | 68 | 68 | 68 | 75 | 88 | 75 | 78 | 72 | 66 | 78 |
| **e** | 95 | 87 | 79 | 86 | 86 | 84 | 88 | 77 | 60 | 79 | 97 | 77 | 87 | 66 | 72 | 76 | 84 | 97 | 84 | 87 | 81 | 75 | 87 |

the shared articulation point. Similar but not so strong reduction can be seen in the columns of (b)(v) and (b)(f) in Table 9.

In general, there is no significant difference between the durations of consonants in VCC and in CCV combinations.

*Table 10*

The specific durations for (b) in CCV combinations in ms, for continuous speech

| **b** | **A** | **a** | **o** | **u** | **U** | **i** | **E** | **O** | **e** |
|---|---|---|---|---|---|---|---|---|---|
| **b** | 80 | 82 | 82 | 75 | 86 | 88 | 85 | 76 | 80 |
| **p** | 76 | 77 | 77 | 71 | 81 | 83 | 81 | 72 | 76 |
| **d** | 55 | 57 | 57 | 50 | 60 | 63 | 60 | 51 | 55 |
| **t** | 52 | 54 | 54 | 47 | 57 | 60 | 57 | 48 | 52 |
| **g** | 73 | 75 | 75 | 68 | 79 | 81 | 79 | 70 | 73 |
| **k** | 52 | 54 | 54 | 47 | 57 | 59 | 57 | 48 | 52 |
| **G** | 72 | 74 | 74 | 67 | 78 | 80 | 77 | 68 | 72 |
| **T** | 83 | 85 | 85 | 78 | 89 | 91 | 88 | 79 | 83 |
| **m** | 42 | 44 | 44 | 37 | 47 | 49 | 47 | 38 | 42 |
| **n** | 62 | 63 | 63 | 57 | 67 | 69 | 67 | 58 | 62 |
| **N** | 60 | 62 | 62 | 55 | 66 | 68 | 65 | 57 | 60 |
| **j** | 49 | 51 | 51 | 44 | 55 | 57 | 54 | 45 | 49 |
| **h** | 77 | 79 | 79 | 72 | 82 | 85 | 82 | 73 | 77 |
| **v** | 72 | 74 | 74 | 67 | 77 | 80 | 77 | 68 | 72 |
| **f** | 66 | 67 | 67 | 61 | 71 | 73 | 71 | 62 | 66 |
| **z** | 71 | 73 | 73 | 66 | 77 | 79 | 76 | 68 | 71 |
| **s** | 61 | 63 | 63 | 56 | 66 | 69 | 66 | 57 | 61 |
| **c** | 73 | 75 | 75 | 68 | 79 | 81 | 78 | 70 | 73 |
| **Z** | 75 | 77 | 77 | 70 | 80 | 83 | 80 | 71 | 75 |
| **S** | 76 | 77 | 77 | 71 | 81 | 83 | 81 | 72 | 76 |
| **C** | 62 | 64 | 64 | 58 | 68 | 70 | 68 | 59 | 62 |
| **l** | 60 | 62 | 62 | 55 | 65 | 68 | 65 | 56 | 60 |
| **r** | 87 | 89 | 89 | 82 | 93 | 95 | 92 | 83 | 87 |

### 3.4. Comparisons with natural speech

As it was seen, the results of the inverse measurement introduced gave relevant duration data. The defined specific duration values are characteristic of Hungarian continuous speech. Using these data the basic, segmental level duration of every sound in an utterance can be given. In Figure 4, the specific duration data and the measured ones of the beginning part of the sample sentence in (1), *A tervezett tárgyalás után...* [ɔ] [t] [ɛ] [r] [v] [ɛ] [z] [ɛ] [tː] [t] [aː] [r] [ɟ] [ɔ] [l] [aː] [ʃ] [u] [t] [aː] [n] are shown.

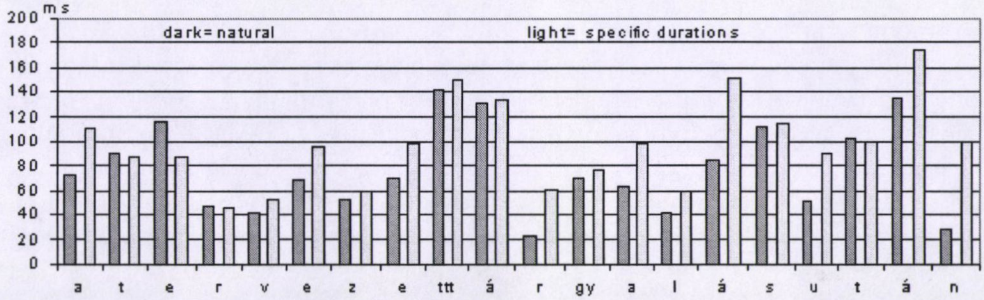


*Fig. 4*
The difference of specific and natural durations in the first part of the sample sentence

The main tendency of the two representations is similar, the largest differences are in vowels. These differences will be eliminated by the suprasegmental level rules (2nd and 3rd step of the model).

## 4. Suprasegmental level duration modification rules

The second phase of the model contains 2 levels, word and phrase level modifications of the specific durations. The main goal here is to determine where and to what extent we should lengthen or shorten the specific duration of the given sound. The modification is performed in the model by using multiplying factors ranging for shortening between 0.5 and 0.95, and for lengthening from 1.1 to 2. A certain factor is determined for each sound of the utterance and applied on the specific durations of the sounds. Comparing the specific durations and the natural ones in the sample sentences and taking earlier results into consideration it was assumed that the further modification level is defined by the word. It was found that the length of the word and the inherent sound types and sound distributions influence the sound durations. The highest level modification (3rd part of the model) concerns the effects of phrase structure.

### 4.1. Word level duration modifications

At this level, the differences between natural and specific durations have been studied by making such duration pictures as was shown in Figure 4. It was found that in most cases the duration of vowels must be shortened, in some cases lengthened. 44 test sentences have been selected from the basic text material and these sentences were used for perceptual evaluation. The measurement setup for the test was basically the same as was shown in Figure 1. The only difference was that the test sentences were played with falling intonation (but without accent). Subjects had to compare two versions of the same sentence with two different duration structures. The first was produced with specific durations, the second with modified ones (using M1 factors and adjusting them to change the duration towards the natural values). The final M1 factors were determined from the results of these listening tests. The perceptual test showed that word level modifications are more important than those on the sentence level. After word level modifications, the duration structure of the utterance reached in most cases the stage of 90% of the final, desired one. Another conclusion was that accents do not influence the duration map of the word, i.e., no lengthening can be shown in most of the cases in accented vowels (accent is on the first syllable of the word in Hungarian). Similar results are reported by Fónagy (1958) and Kovács (2002). Strong accents (e.g., focus) may be exceptions.

It was found that two features define the duration modification on the word level: the sound map of the word and the length of the word. The sound map of the word shows the types of vowels, the consonant clusters, the place of sounds inside the word. Altogether twenty-five basic rules have been defined for the modification of short vowels. Examples are shown for the first short vowel of the word in Table 11. The data of this table show two things, i.e., the modifications are mostly shortenings, and the modification factors are vowel dependent. Separate rules (altogether 48) define the modification factors for long vowels. An example rule set is shown in Table 12 for the sound [aː]. Here separate rules define the modification as a function of the number of syllables in the word. The values of the modification factors express that the [aː] is consistently shortened as a function of the number of syllables of the word.

*Table 11*

Modifying multiplication factors for short vowels in the first syllable of a word longer than two syllables

| | VOWELS | | | | | | |
|---|---|---|---|---|---|---|---|
| SEQUENCE | (i) [i] | (u) [u] | (U) [y] | (o) [o] | (a) [ɔ] | (e) [ɛ] | (O) [ø] |
| # C V C1 | 1 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| # C V C1 C | 1 | 1 | 1 | 1 | 1 | 0.8 | 1 |
| # C V C2 | 1 | 0.8 | 0.8 | 0.9 | 1 | 0.8 | 1 |
| #◇ C V C1 | 0.8 | 0.8 | 0.8 | 1 | 0.9 | 0.9 | 0.8 |
| #◇ C V C1 C | 1 | 1 | 0.8 | 1 | 1 | 0.9 | 1 |
| #◇ C V C2 | 0.8 | 0.8 | 0.8 | 1 | 1 | 0.9 | 1 |
| # V C | 0.8 | 0.8 | 0.8 | 1 | 0.9 | 1 | 1 |
| # V C1 C | 0.8 | 1 | 1 | 1 | 1 | 1 | 1 |
| #◇ V C | 1 | 1 | 0.8 | 1 | 0.9 | 1 | 1 |
| #◇ V C1 C | 1 | 1 | | 1 | 1 | 1 | 1.1 |
| # V C2 C | 1 | 1 | 0.8 | 1 | 1 | 1.3 | 1 |

V = the short vowel in question, C = any consonant, C1 = any consonant but not [r, l], C2 = [r, l], ◇ = article, # = absolute initial position multiplication factor = for example, 0.8

*Table 12*

Modifying multiplication factors for [aː] if it is the only long vowel in the word (for 1, 2, 3, 4, 5 and 6-syllable words)

| | | SYLLABLE | | | | | |
|---|---|---|---|---|---|---|---|
| [aː] in the | SEQUENCE | 1 | 2 | 3 | 4 | 5 | 6 |
| 1st syll. | VC1 | – | 1 | 0.9 | 0.8 | 0.8 | 0.75 |
| | VC2 | – | 1.3 | 1.2 | 1.2 | 1.1 | 1 |
| 2nd syll. | VC1 | – | – | 0.9 | 0.85 | 0.85 | 0.8 |
| | VC2 | – | – | 1 | 1 | 1 | 1 |
| 3rd syll. | VC1 | – | – | – | 0.9 | 0.8 | 0.8 |
| | VC2 | – | – | – | 1 | 1 | 1 |
| 4th and later syll. | VC1 | – | – | – | – | 0.8 | 0.8 |
| | VC2 | – | – | – | – | 1 | 1 |
| Last syll. | VC1 | 1.2 | 0.9 | 0.85 | 0.8 | 0.8 | 0.8 |
| | VC2 | 1.3 | 1.3 | 1.3 | 1.2 | 1.1 | 1.1 |

V = sound [aː], C1 = any consonant but not [r, l], C2 = [r, l] multiplication factor = for example, 1.3

The specific duration of consonants is modified by 8 rules like: shorten the specific duration of CC and CCC clusters if they are not in the last word of the sentence ([ng] and [nk] combinations are exceptions); shorten the specific duration of long stop consonants being at the end of the word (in sentence internal position).

The difference in number of both rule groups shows that in continuous speech the duration of vowels varies more dynamically than that of the consonants. The result of word level modification is expressed in the model as follows: every sound of the word gets a multiplication factor. For example the duration map (the series of M1 factors) of the word *láthatatlan* [l][aː][t][h][ɔ][t][ɔ][t][l][ɔ][n] 'invisible' will show the following picture:

(2) l(1) aː(0.8) t(0.9) h(0.9) ɔ(0.9) t(1) ɔ(1) t(0.9) l(0.9) ɔ(1) n(1)

Comparative measurements have been performed between natural and synthesised durations at this level. It was found that 90% of the modelled durations was very close to the natural ones. Figure 5 shows again the duration map of the first part of the sample sentence in (1) after performing the duration modification on word level (according to step 2). It can be seen that the durations of vowels have been corrected towards the values of the natural sample. This result shows that sound durations in continuous speech are defined mostly by the specific durations and their modification on the word level (steps 1 and 2 in the model).

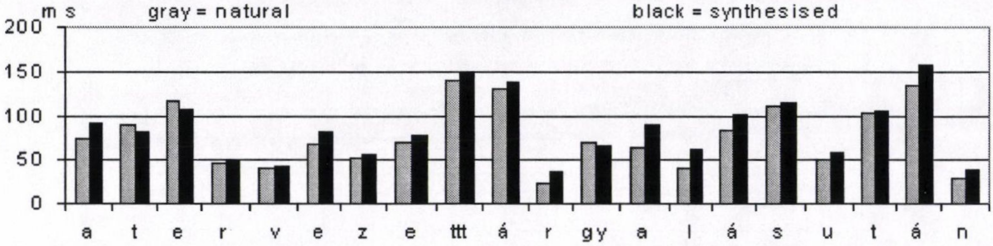


*Fig. 5*
The corrected sound duration values of the sentence part of Figure 4.[1]

## 4.2. Sentence level duration modification rules

In the third step of the model only slight modifications are performed, mainly concerning lengthening: in the last word of the sentence and in the last syllable of the word at a phrase boundary and also in the first syllable of certain questions.

[1] The horizontal axis contains the sounds represented orthographically. The articulation rate was 14 sounds/s in natural speech and 13 sounds/s in the synthesised one. Therefore most of the modelled durations are slightly longer than the natural ones.

## 5. Conclusions

The proposed three-level model gives duration data very similar to natural pronunciation. The most important part of the model is the module of the first level, where the specific (segmental level) durations are determined. The indirect method for the definition of specific durations presented gives relevant data for the basic duration structure of the given language. Furthermore, this method gives us the possibility to define the only theoretically existing, segmental level specific sound durations in the form of exact data for every sound in every sound combination for the given language. The results for Hungarian showed that sound duration values defined with this inverse method correlate with the results of earlier investigations not only for Hungarian but also for English and French. This means that the inverse method presented can be successfully used for the definition of sound durations for continuous speech.

For Hungarian approximately 20,000 individual specific sound durations (in triphone sound sequences for the middle sound) have been determined.

Specific duration values can represent a good basis for further (suprasegmental level) duration modifications. The second step of the model represents a semi-suprasegmental level in which fine modifications of specific durations in the word are summarised. Rules can be determined at this level to characterise the value of shortening or lengthening of the sounds. Measurement results show that the sound durations in Hungarian are formed mostly on the segmental level and on the word level. Phrase and sentence level modifications have a less important role in forming final durations.

The advantage of this model can be summarised in five points:

1. The sound durations can be determined as a function of adjacent sounds for continuous speech (independently of the speaker or the type of text in question). The specific durations give a good basis for further studies about the organisation of the time structure of speech.

2. The influence of articulation on duration can be separated from other possible factors.

3. The results are recontrollable at any time.

4. The results show that sound durations are determined basically by the articulation and by the sound map of words in Hungarian. Phrase and sentence level influence on sound durations is small.

5. The intrinsically existing specific durations are expressed by actual numerical values for the first time. They could not be derived till now on the basis of direct measurements.

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# THE TEMPORAL ORGANISATION OF SPEECH IN MONOLINGUAL AND BILINGUAL CHILDREN

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## Abstract

Research on the temporal organisation of speech with respect to age is extremely important as it may provide empirical confirmation for the various models of speech production. With the advancement of age, speech motor control becomes more secure, and so the child gradually approaches the level of articulation and speech tempo typical of adults. There have been numerous works published on the temporal relations of English-speaking, normally developing children; however, the relevant literature still lacks data on bilingual children. The present paper aims to fill this gap: it discusses the temporal organisation of speech in Hungarian–Bulgarian bilingual children between the ages of 9 and 13 and monolingual children of the same age in a developmental perspective. The data on monolingual children in this paper also break new ground as only few papers have dealt with the speech rate of Hungarian children and none with that of Bulgarian children.

## 1. Introduction

In the process of acquiring language, the child learns to understand and produce the speech sounds, sound sequences, words, and syntactic structures of his language from which he constructs sentences and coherent utterances. As the child ages, his linguistic competence also improves, and as years go by, he becomes a skilled speaker–listener. By the age of three, the normally developing child is capable of correctly producing most speech sounds, talks a lot and does it with pleasure, and he frequently uses complicated syntactic structures (Downing–Valtin 1984). By the age of six, he has built a considerable vocabulary, and he develops the kind of language awareness that enables him to acquire written language, too. We can observe a high level of language awareness in 8–10-year-old children; in most cases, this is the age when foreign language teaching also begins. Although it is very similar to that of adults, the speech of 10–14-year-olds may show significant differences, typical of this age (for example, in the area of temporal relations), and so it may well be justified to refer to it as "teenage language" (Gósy 1999).

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The improvement of the linguistic competence of the child is not only displayed in the growth of his vocabulary or in the correct use of grammatical–syntactic structures, but also in the strengthening of his speech motor control (Hall–Yairi 1997). The expansion of speech motor control affects the temporal relations of speech—the duration of sounds or sound sequences, the whole of speech rate, as well as pause-related characteristics. The discovery of the changes regarding the temporal organisation of the speech of a normally developing child may not only help to recognise and treat defective speech development, but it may also serve as a ground for comparison in the research of the speech development of bi- and multilingual children.

Several researchers have dealt with temporal patterning in the speech of monolingual children (e.g., for English: Boutsen–Hood 1997; Hall–Yairi 1997; Kowal et al. 1975; Tingley–Allen 1975; Walker et al. 1993; for Hungarian: Fónagy–Magdics 1960; Gósy 1991a; Laczkó 1991). The majority of these present a cross-section analysis. Their results can be summed up as follows: (i) fluency increases with age, together with speech rate; (ii) the acoustic–phonetic aspects of pauses differ from those of adults—we rarely find hesitations in the speech of children; (iii) the speech rate of adults is slower in brief utterances, while it is quicker in longer ones; children display this pattern only as they age; (iv) the speech rate of children shows quite considerable individual differences in the process of developing (cf. Smith–Kenney 1999's longitudinal analysis), as well as in relation to mean values.

The problem of speech rate motor control is discussed by various theories and models. According to the linear models, the changes occurring in the temporal relations of speech are caused by mechanisms that, with the help of articulatory movements, simply shorten or lengthen the duration of sounds (Lindblom 1968). Contrary to this, the advocates of the non-linear models claim that changes in speech rate reorganise the temporal structure of the whole articulatory process (cf. Gay 1981). As the views altered, it became clear that the motor control over the temporal organisation of speech was not directed by a single mechanism; it is still unclear, however, whether the various functions (such as those responsible for the temporal patterning of sounds, syllables, or the whole speech process) work in total isolation or in some sort of harmony (Hall–Yairi 1997).

The majority of speech production models (such as Dell 1986; Garrett 1982; Levelt 1989) have been created using data from monolingual adult speakers, and they contain practically no information on the speech production mechanisms of children or bilingual speakers (Poulisse 1997). Several attempts have been made at adapting these models to bilingual speakers (e.g., Green 1986; Bot 1992; Bot–Schreuder 1993; Poulisse–Bongaerts 1994); however, a great number of questions have been left unanswered, including those concerning the temporal patterning of bilinguals' speech. According to Bot (1992), the fact that bilingual persons use more than one language should not necessarily slow down their speech production compared to that of monolingual individuals. The available data pertaining to acquiring/learning a second language (Wiese 1984; Möhle 1984; Lennon 1990) show that there is a clear connection between the temporal organisation of speech (the duration of pauses, articulation rate, etc.) and competence in the given language. It is unclear how valid these findings are regarding the temporal structure of bilinguals, since, especially in the case of "stable" bilinguals (cf. Grosjean 1997), their competence in both languages may well be considerably high.

The topic of the present study is to investigate the temporal organisation of speech in Hungarian–Bulgarian bilingual children and Bulgarian and Hungarian monolingual children. The aim of the investigation is (i) to show the similarities and differences in the temporal organisation in the speech production of mono- and bilingual children, and (ii) to expand our understanding of the temporal organisation of speech in children. Based on the results of our previous research, we set up two hypotheses, according to which, (i) the articulation rate and speech rate in bilingual children are expected to be slower than in monolinguals; and (ii) we expected speech rate to increase by age, independently of mono- or bilingualism.

## 2. Material and method

Altogether 60 children took part in our experiment, 36 girls and 24 boys. Of them, 20 were Hungarian–Bulgarian bilingual children, some of whom went to the Bulgarian primary school in Budapest, while the others to Hungarian primary schools. 20 participants were Hungarian monolingual children, and another 20 were Bulgarian monolingual children. These children were the pupils of a primary school in Budapest and another in Sofia, respectively. The proportion of boys and girls was the same in each group (twelve girls and eight boys). At the time of the experiment, the children were third-, fourth- and sixth-form pupils.

The majority of the bilingual children (13 participants) had acquired Hungarian and Bulgarian at the same time; Bulgarian was the first language in the case of five children, while it was Hungarian in the case of two. The result of these differences was that the set of the bilingual participants was not fully homogeneous in terms of competence in either Hungarian or Bulgarian. Since bilingualism is a relatively complex linguistic phenomenon, and thus the children in the experiment use the two languages differently and for different purposes, the creation of a homogeneous group is practically unaccomplishable.

We divided the children into two age groups (see Table 1). In the first age group, the age of the children was 9 to 10 years (by this time, language acquisition is by and large completed), while in the second group, there were 12 to 13-year-olds (the commencing of puberty, the second biological barrier), which enables one to trace linguistic development.

*Table 1*

Data relating to the age of the participants

| PARTICIPANTS | AVERAGE AGE | DEVIATION |
|---|---|---|
| Hungarian monolingual children | 9;11 years<br>12;5 years | 9;5–11;0 years<br>11;10–13;0 years |
| Bulgarian monolingual children | 10;1 years<br>12;9 years | 9;7–11;2 years<br>12;5–12;11 years |
| Hungarian–Bulgarian bilingual children | 9;10 years<br>12;8 years | 9;0–11;0 years<br>12;5–13;2 years |

The children were given the following task. They had to tell a continuous story based on a picture series with four items. We recorded the stories on tape, then noted down the recording, faithful to the original. Afterwards, we measured the time of the speech signals, the pauses, and the whole utterance to the ms using a digital signal processing device (CSL 4300B), then we added the number of sounds up. We investigated three factors: **articulation rate**, **speech rate**, and the quantitative and qualitative aspects of the **pauses**. Articulation rate is the speed of speech without pauses, while speech rate is that with pauses; their value is given in sound/second (s/s).

The following considerations played a role when processing the data: (i) the total and age-relative values of articulation rate and speech rate, and (ii) the acoustic–phonetic characteristics of the pauses. The statistical evaluation of the data was based on a one-way analysis of variance.

## 3. Results

Table 2 displays the average duration of the stories. The data clearly show that the majority of the children told the story within 20 to 30 seconds, and so there is no difference here between mono- and bilingual children. This suggests that the duration of the narratives mostly depends on the age of the children, and has no connection to mono- or bilingualism. The standard deviation data are spread within wide margins for each group, which is evidence for the existence of individual differences.

*Table 2*

The average duration of the stories

| PARTICIPANTS: | HUNGARIAN (MONOLINGUAL) | HUNGARIAN (BILINGUAL) | BULGARIAN (BILINGUAL) | BULGARIAN (MONOLINGUAL) |
|---|---|---|---|---|
| AVERAGE (S): | 22.6 | 23.3 | 28.2 | 24.1 |
| DEVIATION (S): | 8.3–47.3 | 10–66.7 | 10–51.7 | 13.2–50.3 |

According to the data, there is basically no difference between the average articulation rates of monolingual children. This tendency shows up in bilingual children's Hungarian and Bulgarian articulation rates, too. The divergence between the various data is not significant statistically either (for monolinguals: $p=0.8210$, for bilinguals: $p=0.9657$). If, however, we compare the mean values of the articulation rates of monolingual and bilingual speakers (cf. Figure 1), we find significant differences (for Hungarian: $p=0.0287$, for Bulgarian: $p=0.0434$).

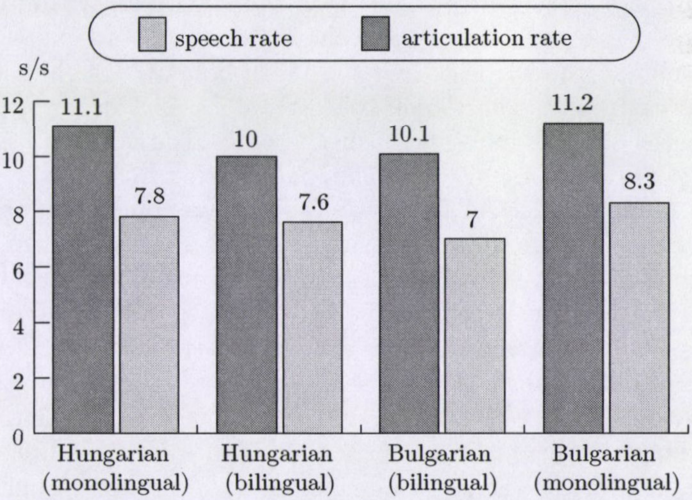


*Fig. 1*
The aggregated mean values of articulation and speech rate

The data on speech rate have significantly altered compared with articulation rate (cf. Figure 1). The difference between the speech of the two monolingual groups and the Hungarian and Bulgarian speech of the bilinguals have increased (although not significantly: monolinguals: $p = 0.3860$; bilinguals: $p = 0.6420$). The difference between the speech rate of Bulgarian monolingual speakers and that of Bulgarian bilinguals has remained nearly the same, while the difference between Hungarian monolinguals and bilinguals has decreased (but even this is not significant: for Bulgarian: $p = 0.577$, for Hungarian $p = 0.3109$).

We may conclude that as far as the mean values of articulation rate and speech rate are concerned, bilingual children are slower in both languages than monolingual ones. The reason for this is undoubtedly bilingualism.

We can offer a much subtler analysis with the help of the standard deviation values of articulation rate and speech rate (Table 3).

*Table 3*

The standard deviation of articulation rate and speech rate

| PARTICIPANTS: | HUNGARIAN (MONOLINGUAL) | HUNGARIAN (BILINGUAL) | BULGARIAN (BILINGUAL) | BULGARIAN (MONOLINGUAL) |
|---|---|---|---|---|
| ARTIC. TEMPO (S/S): | 8.9–13.7 | 7.1–13.4 | 7–13.8 | 8.4–13.2 |
| SPEECH RATE (S/S): | 5.9–11 | 4.6–11.1 | 2.5–10.3 | 5.8–11.6 |

The values of articulation rate and speech rate fluctuate within broad limits in each group. The differences between monolingual and bilingual children are evident not at the highest deviation threshold values, but in the lower regions, that is to say, conspicuously slow values also occur in articulation rate and speech rate in bilinguals. In the case of articulation rate, the divergence between monolingual and bilingual children was 1.8 s/s (Hungarian) and 1.4 s/s (Bulgarian). As far as speech rate is concerned, the speech of the slowest Bulgarian monolingual child was 3.3 s/s faster than the slowest bilingual, while in the case of Hungarian, we did not notice such a significant difference. This fact shows that in the Bulgarian speech of bilingual children there are longer pauses than in their Hungarian speech.

The temporal organisation of speech processes—such as articulation rate and speech rate—changes with age during language acquisition (cf. Walker et al. 1993; Tingley–Allen 1975), but similar changes are a feature of later ages, too (Gocsál 2000). The results concerning the age groups in our experiment carry important information. Figure 2 shows the average values of articulation rate, broken down into age groups.

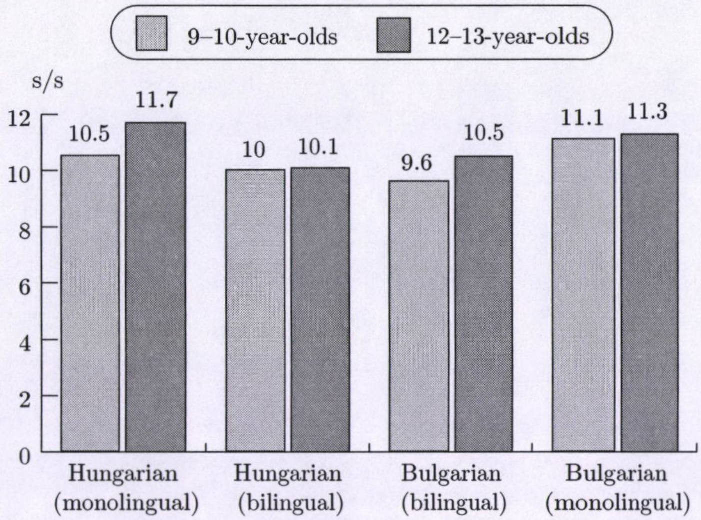


*Fig. 2*
Articulation rate with respect to age groups

The articulation rate of 12–13-year-old children is faster than that of 9–10-year-olds, independent of mono- or bilingualism. The reason for this is perhaps that the speech planning and speech production processes of older children are more rapid (cf. Boutsen–Hood 1997; Menyhárt 2000), and this is manifested in their articulation rate, too.

The typical difference between the younger and older groups was, however, not statistically significant. The greatest difference surfaced between the two age groups of Hungarian monolingual children (1.2 s/s; $p = 0.0585$), while in other groups the difference was below 1 s/s (Bulgarian monolinguals: 0.2 s/s; $p = 0.7672$; bilingual Bulgarian: 0.9 s/s; $p = 0.3102$; bilingual Hungarian: 0.1 s/s; $p = 0.9138$).

In Figure 3 (overleaf) we illustrate the distribution of the total mean values of speech rate with respect to age groups. The data show a similar tendency as those on articulation rate, that is to say, it was the older children in all age groups that spoke more rapidly. The differences are not significant here either (Hungarian monolinguals: $p = 0.0838$, Bulgarian monolinguals: $p = 0.6905$, Hungarian speech of bilinguals: $p = 0.8433$; Bulgarian speech of bilinguals: $p = 0.0921$). A language dominance is also observable in bilingual children: while for 12–13-year-old children we got equal speech rate values for

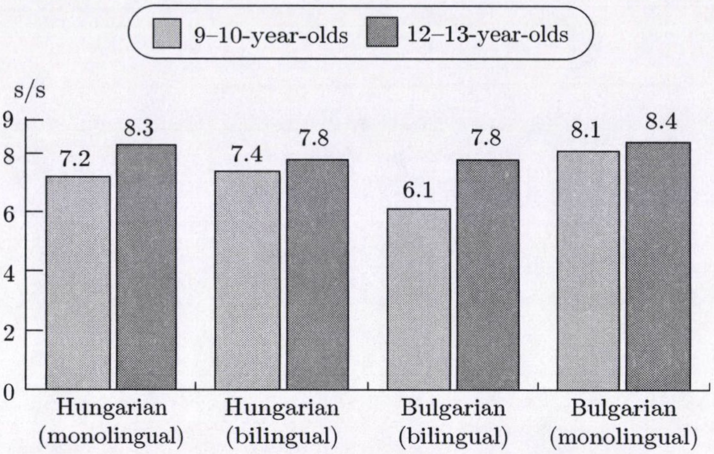


*Fig. 3*
Speech rate with respect to age groups

both languages, the Bulgarian speech rate of 9–10-year olds is slower than the Hungarian (there was not such a great difference in articulation rate).

We also investigated the differences between boys and girls, with respect to both articulation rate and speech rate (Table 4). On the basis of the relevant literature (cf. Kowal et al. 1975; Gocsál 2001 for Hungarian), we had thought that girls should talk faster. The data did not verify our hypothesis, because we could not prove a straightforward tendency based on our findings. Practically, there was no difference based on gender in the speech of monolinguals and bilinguals. We noticed a greater divergence only in the Bulgarian speech of bilingual children (in this case, unquestionably, the girls talked more rapidly). It appears that in the ages we investigated the gender differences typical of adults do not occur as yet.

*Table 4*
Gender-based differences in articulation rate and speech rate (s/s)

| GENDER | HUNGARIAN (MONOL.) | | HUNGARIAN (BILING.) | | BULGARIAN (BILING.) | | BULGARIAN (MONOL.) | |
|---|---|---|---|---|---|---|---|---|
| | *artic. tempo* | *speech tempo* | *artic. tempo* | *speech tempo* | *artic. tempo* | *speech tempo* | *artic. tempo* | *speech tempo* |
| GIRLS | 11.1 | 7.9 | 10.4 | 7.3 | 11.1 | 8 | 11.1 | 8.2 |
| BOYS | 11.2 | 7.8 | 9.7 | 7.5 | 8.2 | 5.9 | 11.5 | 8.7 |

The comparison of the values of articulation rate and speech rate of the individuals may be indicative of their language dominance and linguistic skills. Figure 4 shows the individual values of Hungarian and Bulgarian articulation rate.

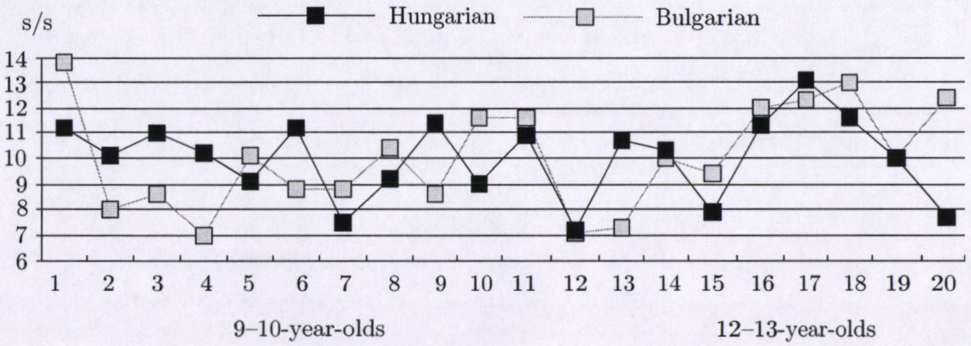


*Fig. 4*
The individual values of articulation rate in the Hungarian and Bulgarian speech of bilingual children

We can notice smaller (below 1 s/s) differences between the articulation rates of the two languages in the case of eleven children, while the differences are higher in nine participants. Apparently, the occurrence of the greater differences is connected to age: seven children belong to the younger generation, while the articulation rate was significantly higher only in the case of two older children (marked with "13" and "20" in Table 4). As far as the languages are concerned, ten children spoke rapidly in Hungarian and ten in Bulgarian.

If we compare the individual values of articulation rate and speech rate (Figure 5, overleaf), we can see that the difference is significant in the case of 15 children as far as speech rate is concerned (3 s/s, or even higher). The two values are drawing near to each other in five participants. Eleven bilingual speakers talked more rapidly in Hungarian than in Bulgarian, whereas the Bulgarian speech rate was higher in the case of nine. We found only one child whose articulation rate was higher in Bulgarian, and the speech rate was more rapid in Hungarian. There are great individual differences both in articulation rate and speech rate. The reason for this, on the one hand, is to be found in the differences between linguistic skills, on the other, in the characteristics of the temporal organisation typical of children's speech (cf. Smith–Kenney 1999; Hall–Yairi 1997 for English).

The differences evident in the values of articulation rate and speech rate are caused by the pauses occurring in speech. There are two basic types of

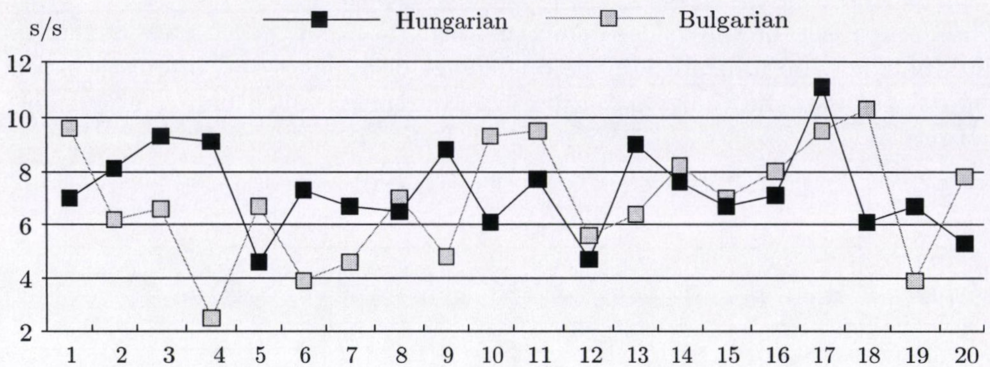


*Fig. 5*
The individual values of speech rate in the Hungarian and Bulgarian speech of bilingual children

pauses: silent pauses (a total lack of signal), and hesitation or filled pauses, which may comprise the realisation of various speech sounds, and which may be caused by a gap in the logical course of thought or a sudden event (Sallai – Szende 1990).

Pauses comprised approximately one third of the speech of the children taking part in the experiment: 31% in Hungarian monolinguals, 27% in Bulgarian monolinguals, 29% in the Hungarian speech of bilinguals, and 34% in their Bulgarian speech. These percentages agree with those registered for the pauses occurring in the spontaneous speech of native adult speakers of Hungarian (Gósy 2000a).

We also investigated the qualitative distribution of pauses, and found that, independent of mono- or bilingualism, the majority of the pauses in the speech of children consisted of silent pauses—88%—, and only 12% of them were hesitations. We found this in all of the children, there were no individual differences here. We also found that this kind of distribution of pauses is typical of child language (see Laczkó 1991), the percentage of hesitations in the spontaneous speech of adults is greater, comprises around 30% (Gósy 2002). In the rest of the paper, we will treat silent and filled pauses equally, and we make no difference between them.

Figure 6 displays the mean values of the children's pauses according to age groups. Hungarian monolingual children produced the shortest pauses, the average pauses of the Bulgarian monolinguals were somewhat longer. Bilingual

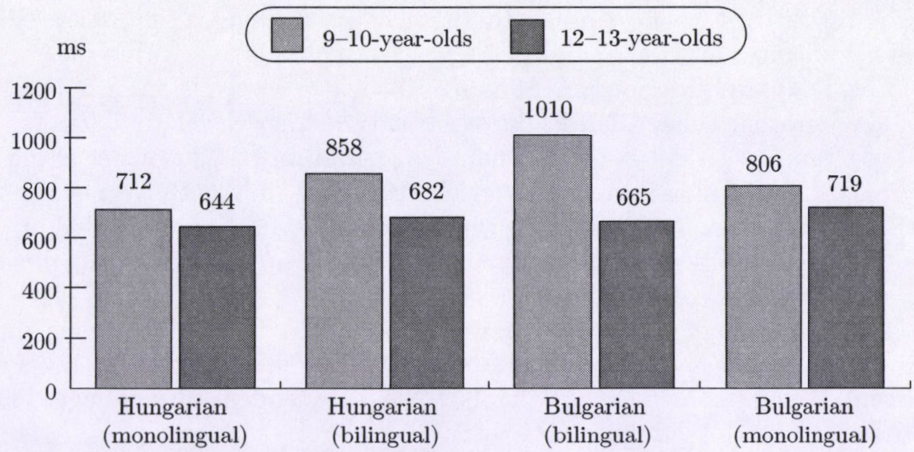


*Fig. 6*
The average values of pauses with respect to age

children had longer pauses on average in both languages than the monolingual ones. The differences are not significant in either case, however.

The average duration of the pauses decreases by age. This is particularly evident in the case of bilingual children, and suggests that the coordination of speech planning and production requires longer time for younger bilinguals.

Table 5 shows the standard deviation values of pauses according to age groups. The broadest margins occur in the pauses of Bulgarian monolingual speakers (from 275 to 2351 ms), similar values were found in the pauses of the Bulgarian speech of bilinguals.

*Table 5*
The standard deviation values of pauses (ms)

| PARTICIPANTS: | HUNGARIAN (MONOLINGUAL) | HUNGARIAN (BILINGUAL) | BULGARIAN (BILINGUAL) | BULGARIAN (MONOLINGUAL) |
|---|---|---|---|---|
| 9–10-YEAR-OLDS: | 264–1163 | 314–1189 | 505–2330 | 413–2351 |
| 12–13-YEAR-OLDS: | 437–870 | 367–1000 | 427–1004 | 275–1656 |

In the Hungarian speech samples, the distribution of pauses is more limited than in the Bulgarian (independently of mono- or bilingualism). Comparing the data, we can see that a Hungarian monolingual child produced the shortest pause, whereas the longest one occurred in the speech of a Bulgarian monolingual participant. The distributional values of bilingual children's pauses turned out to be similar to those of monolinguals'; however, they occurred within narrower margins.

The temporal distribution of pauses provides valuable information on how children use time, that is, how much time they need to organise direct spontaneous speech. The temporal distribution of pauses occurring in the speech of Bulgarian monolingual children and in the Bulgarian speech of bilinguals is shown in Figure 7, whereas the distribution of pauses in the speech of Hungarian monolinguals and the Hungarian speech of bilinguals is displayed in Figure 8.

The frequency of pauses decreases proportionally by the increase of time, there is no difference in this respect between either monolingual or bilingual children. We can conclude that this factor is independent of language, bilingualism, or age (for adults, cf. Gósy 1998).

The frequency of pauses was the greatest between 200 and 300 ms, and there was no difference between mono- and bilingual children here either. We can observe another relative peak, around 1000 ms, in both figures. In all probability, this indicates a pause for thinking in the process of speech design.

The fact that bilingual children produced relatively more and rather long pauses (above 3000 ms) may be indicative of the difference regarding the linguistic skills between the monolingual and bilingual participants. Presumably, they find it difficult to organise what they want to say (especially in Bulgarian).

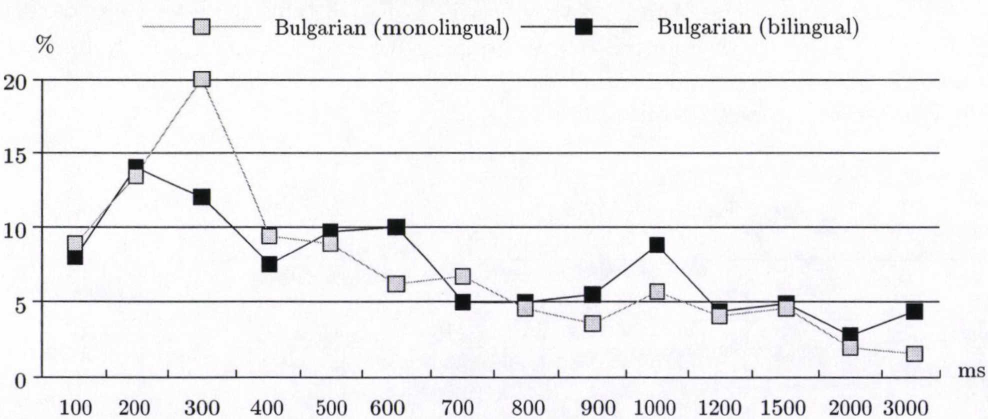


*Fig. 7*
The distribution of pauses in the Bulgarian speech of mono- and bilinguals

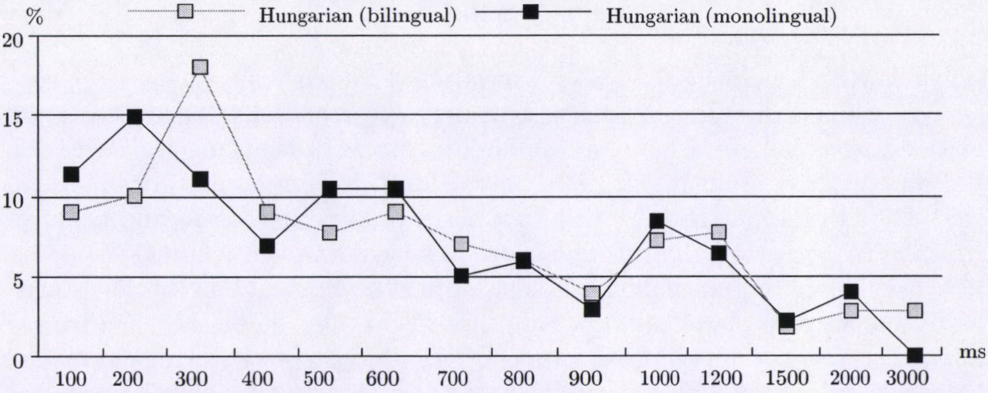


*Fig. 8*

The distribution of pauses in the Hungarian speech of mono- and bilinguals

A question often raised concerns the problem of where exactly pauses occur in speech. Since pause is a segmentation sign at the same time (Fónagy 1967), we expect that the greater majority of pauses occur at phrase boundaries. However, this is not the case in the spontaneous speech of Hungarian-speaking adults (cf. Gósy 1999), pauses are rather more frequent within phrases. Nevertheless, children have pauses at boundaries of phrases rather than within them, and this distinguishes them from adults (see Table 6).

*Table 6*

The place of pauses in the stories

| PLACE | HUNGARIAN (MONOLINGUAL) | HUNGARIAN (BILINGUAL) | BULGARIAN (BILINGUAL) | BULGARIAN (MONOLINGUAL) |
|---|---|---|---|---|
| PHRASE BOUNDARIES | 65.5% | 64.5% | 51% | 58.5% |
| WITHIN PHRASES | 34.5% | 35.5% | 49% | 41.5% |

The reason why pauses occur at phrase boundaries may derive from the peculiarity of the task (picture description), since most children used complete, complex sentences to tell the story. An exception to this is the Bulgarian speech of bilingual children, where the number of pauses occurring at phrase boundaries and within phrases is approximately the same. This is caused without doubt by the partial lack of linguistic skills, as the children have difficulties at speaking in the non-dominant language. From time to time, they do not know or cannot activate a particular word, and the result of this is that pauses occur within phrases.

## 4. Conclusions

The following conclusions may be drawn based on our experiment.

We verified our first hypothesis, namely, we found that the articulation rate and speech rate of bilingual children in both Hungarian and Bulgarian is **slower** than monolinguals'. The reason for this is undoubtedly bilingualism. The advantage that the child socialises in two languages, and acquires two languages, entails that his speech processes slow down when we compare them with monolingual children. This slowing down is only significant statistically in the case of articulation rate, but it can also be observed in speech rate and pause production as a tendency. If we compare the Hungarian and Bulgarian speech of bilingual children, we find that the articulation rate for both languages is basically the same, there is, however, a difference in the values of speech rate—their Hungarian speech is somewhat faster. This fact indicates the existence of a dominant language environment.

The significant difference between articulation rate and speech rate verifies the important role of pauses. The greatest majority of pauses (88%) are silent, which is a fact independent of mono- or bilingualism. Another aspect, also typical of child language, is that pauses frequently occur at phrase boundaries, which indicates the working of particular speech planning and production mechanisms (characteristic of the given age) on the one hand, and may be the effect of the peculiarity of the picture description task, on the other.

We also verified our hypothesis concerning age: it was the older participants whose articulation rate and speech rate were higher, both in the case of monolingual and bilingual children. The reason for this may be that 12–13-year-old speakers are slowly approaching the values of adult speakers. Although there were differences between girls and boys, we could not find a unanimous tendency based on the data.

We observed great individual differences in the temporal organisation of the speech of monolinguals, but especially in that of bilinguals, not only between the various speakers, but also within one individual, with respect to the two languages. These results show the importance of language skills on the one hand, and the complexity of bilingualism, on the other. The great individual differences and the fact that bilingual children are somewhat slower than their monolingual mates also calls attention to the slower workings of their speech planning and production mechanisms, which may well influence their learning processes.

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# SPEECH PERCEPTION DEFICITS AND THE UNDERLYING NATURE OF DEVELOPMENTAL DYSPHASIA

MÁRIA GÓSY

## Abstract

Developmental dysphasia is a specific and primary disorder of oral language development which occurs in children with normal hearing and normal intelligence, having neither objective neurological diseases nor emotional or communicative disorders, and is characterised by more serious deficiencies in perception than in production processes. The relevant literature has mainly been focusing on expressive linguistic skills so far; whereas with respect to the mechanism of speech perception, only certain component processes have been investigated. The present paper presents pioneering work in exploring specific perception disorders in dysphasic children and discusses interrelationships of the operation of component processes within the total system of speech perception. On the basis of the foregoing, delayed speech and the dissociation of production and perception are discussed in the framework of current theories of language acquisition and hypotheses concerning the operation of defective processes.

## 1. Introduction

Children's development of speech perception begins in the very first weeks of life. Newborn babies are able to make fine distinctions among speech sounds after just a few weeks. The perceptual loss suffered by the end of the first year is a consequence of the fact that the little child continues his interaction with his native language (Berko Gleason–Bernstein Ratner 1998). During first language acquisition, the child's mother-tongue perception base and operative strategies of perceptual processes gradually take shape from age one onwards. Children start speaking at the same age all over the world as if this happened at the signal of an internal "biological clock" (Aichison 1976). A well-known phenomenon of infantile language acquisition disorders, however, is delayed speech. The apparently normally developing child fails to start speaking at the expected time, or communicates with just a few words, often expressing what he means by gestures and making himself understood in that way. It seems as if that biological clock failed to strike even though the child's hearing and intelligence are not defective. We speak of delayed beginning of first language acquisition if, at the age of 2;0 for a girl and 2;6

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for a boy, a child fails to speak or just uses a few words (is in the period of holophrases). A child who does not begin to speak by the age of two (and a half)—irrespective of the actual language being acquired—is taken to be a delayed speaker (Ludlow 1980a; Paul–Shiffer 1991). Such delay may have a number of negative consequences for all processes of speech, or specifically for some processes, and even may have adverse effects on learning to read and write later on.

The phenomenon is referred to by various terms, depending on which aspect is emphasised, whether it is the fact of delay ('speech/language delayed children', cf. Richardson 1983; Psarommatis et al. 2001, or 'late-talking children', cf. Paul–Shiffer 1991), the assumed cause ('central auditory processing disorder', cf. Neijenhuis et al. 1999), the difference from aphasia ('developmental dysphasia', cf. Wieke 1977; Duvelleroy-Hommet et al. 1995), or whether the existing language state is generalised ('language impairment/disability' or 'specific language impairment', cf. Ludlow 1980b; Crystal et al. 1989; Palmour 1997) or the consequences are highlighted ('learning disorders/disabilities', cf. Kraus et al. 1999). Hence, it is not only the case that a multitude of terms are being used but what often results in misunderstandings is that the same expression is used to refer to diverse types of disorders whereas the same phenomenon is referred to by diverse names. For instance, the term 'dysphasia' might be defined as the 'disturbance or the loss of ability to comprehend, elaborate or express language concepts' (Cromer 1991). In this definition, controversial as it is, the confusion with 'aphasia' is evident. Specific language impairment can obtain without delayed speech. 'Developmental dysphasia' also occurs as synonymous with 'specific language impairment' or 'language-learning disability'. The problem is partly due to the fact that the diagnostic criteria and etiology of developmental dysphasia are still inadequately defined (Palmour 1997).

In this paper, the impairment of children with delayed speech development will be called 'developmental dysphasia'. Thus, the problem at hand can be clearly distinguished from children's aphasia, while it specifically includes the delayed beginning of speech. Furthermore, it includes the fact of language disturbance (without any reference to the consequences or the state itself). In our view, developmental dysphasia is a specific and primary disorder of oral language development which occurs in children with normal hearing and normal intelligence, having neither objective neurological diseases nor emotional or communicative disorders, and is characterised by more serious deficiencies in perception than in production processes (whatever problems the child's expressive language shows). This approach is partly in harmony with some definitions found in the literature (e.g., Duvelleroy-Hommet et al. 1995; Kovac et al. 2001), but puts more emphasis on the dissociation of production and perception. It has also been shown that nonverbal acoustic processing works well with these children, too, therefore speech perception difficulties do not result from a possibly poor hearing performance (Ludlow et al. 1983; Rosen et al. 1997).

The diversity of terminology may reflect problems of definitions, or rather of the ideas behind them. All this is compounded by the fact that, whenever the biological clock fails to strike and the child does not begin to speak at the expected age, the process of first language acquisition may go on in diverse ways, showing wide individual variety (obviously not independently of the reason for the delay). The problem may cover the whole linguistic organisation but it may also be restricted to the articulatory or perceptual mechanisms, to the working of the mental lexicon, or any combination of these.

These problems of definition and content also suggest the controversial nature of the theories underlying them. There is no extant theory that would unambiguously account for the normal, as well as the non-normal, processes of first language acquisition. The acquisition of the mother tongue is a phenomenon that many theories set out to explain. Along with the major trends, several hypotheses are known that are amalgamations of certain aspects of two or more theories (a fairly recent example is emergentism, cf. MacWhinney 1998). The five most comprehensive hypotheses are as follows. (i) Genetically encoded language faculty. It assumes that the ability to perceive and acquire certain linguistic relationships is innate to the child. There may exist certain pre-set specifically linguistic strategies for the acquisition of language structures (Chomsky 1957). (ii) Learning theory is based on the assumption that language development is a result of adults' reinforcement and general principles of the learning process. It includes at least three kinds of learning: classic conditioning, operant conditioning, and social learning. (iii) Cognitive theory. According to this hypothesis, language is a subordinate part of cognitive development, dependent on the attainment of various concepts. (iv) The social interactionist theory claims that children acquire language in part through the mediation and help of others, rather than purely through their own mental activity in processing adult language. (v) Connectionist models are based on processing units that are responsible for connections, associations during language learning.

The question, then, is which theory can best account for delays in language acquisition and the resultant dissociation between speech perception and production. Many different hypotheses are known (cf. Bishop 1992), most of which can be subsumed under either the group of competence-based or that of performance-based theories. In the first case, the problem is explained by incomplete knowledge, missing rules/principles, or incomplete linguistic constraints. On the other hand, performance-based theories assume that the child's linguistic impairment is a secondary phenomenon, essentially a consequence of non-linguistic processing impairments, that is, it is a kind of functional linguistic processing deficit (Gathercole–Baddeley 1990; Evans 2001). There is also a view according to which the explanation for language acquisition problems can be found in psychological theories of learning (Obler –Gjerlow 1999). Several hypotheses have also been advanced to explain the dissociation of perception and production. One of these claims that the basic linguistic deficiency of the dysphasic child is manifested in the faulty operation of his perceptual processes (cf. Coleman 1998). The issue of the independence of the language faculty is raised in several theories (cognitive theory, connectionist models). With an autonomous language faculty, the problems of both impairments and dissociations can be explained as a highly specific deficit in a language "module". In view of the foregoing and our own results, the following statements can be made.

(i) Deficiencies of first language acquisition should receive an attempted explanation within models of normal language acquisition.
(ii) Performance-based theories offer a better solution since they account for functional and operational impairments, dissociations, as well as the working of correction mechanisms (cf. the claim that linguistic functions and cognitive operations are not the same: Cromer 1991).
(iii) The performance-based approach involves claims taken from several theories of language acquisition (the fact of genetic encoding, the relative independence of linguistic operations, the role of the adult model). Hence, further details have to be clarified before the performance-based approach can be more strictly associated with one or two theories of language acquisition.

In terms of the performance-based theory, a child who begins to speak too late is taken to be dysphasic as long as, due to the delay, he shows some disturbance in **any** area of language use. For a long time, delayed speech development was taken to be a problem of speech production. By now it has become evident for both theoretical and practical purposes that it is the state of the total linguistic system that has to be investigated in such cases, including speech perception processes. Therefore, developmental dysphasia is seen as an overall delay in language development indicating that some deficit is affecting all areas of language acquisition. The crucial observation with dysphasic children is that, after the age of three, their speech production starts developing and their ongoing language acquisition concerns all areas of language except the processes of speech perception. This may be related to the reaction of the adults surrounding the child (instinctive reinforcement primarily concerns the expressive side), a fact that lends even more support to the social interactionist theory, and thus indirectly to the performance-based hypothesis.

Delayed speech may have a number of causes, both organic and functional (the most frequent causes are mental retardation, deafness, hearing impairment, autism, dysarthria, stammering, stimulus-deprived environment, psychic disturbances, specific language disorder). Causes that have to do with neurological disorders may be functional or organic; whereas operational and environmental causes are functional ones. In the latter cases, psychic and genetic origins can both be assumed. The factors leading to dysphasia being so numerous results in a syndrome-like character of the whole problem. The dysphasic child, lacking appropriate speech production, will use gestures or hand-signs in order to express his thoughts. These environmental or body signs, gestures, are previously visually perceived, identified, and adapted to the child's personal needs. In the interaction between child and adult, a special kind of "bilingualism" emerges: the adult produces verbal messages for the child, whereas the child responds to the verbally decoded messages by gestures or signs, and uses the latter for communicating his own ideas and delivering his messages (Gósy 1998). His communication is thus non-verbal. The adult is forced to process non-verbal messages but then reacts to them verbally again. Permanent code-switching takes place: in the case of the adult, non-verbal processing is followed by verbal reaction, whereas with the child, verbal processing is followed by non-verbal response. Gestures in this case represent some kind of language. This raises the theoretical question of whether there may exist language in one's mind without being manifested in speech in the usual manner. Steinberg (1993) offers a simple criterion for deciding the issue of language vs. non-language. He says a person who cannot speak possesses language if he is able to communicate by signs in the same way as others communicate by speech. This can be taken to cover the sign system of dysphasic children as well as the various sign languages used by the deaf and the severely hard of hearing. The signs used by dysphasics—though undoubtedly manifestations of 'language'—enable them to communicate messages that are by far more restricted than the ones that can be conveyed by speech. It is astonishing, at the same time, how complex trains of thought these children often try to communicate. Eric Lenneberg reported on an eight-year-old boy who had learned to understand speech despite his congenital inability to speak (cf. Jakobson 1971, 293). Jakobson interprets this as evidence for a higher degree of autonomy of the decoding process; he also refers to the fact that children who have not yet started speaking also understand adults. This latter argument is misguided since the speech processing of pre-speech children is fundamentally different from the process of speech perception/comprehension a couple of years later. It is nevertheless a fact that several cases are known in which what operates is almost exclusively the perceptual side of language activity. The present author also had the privilege of examining a seven-year-old child who had been born with a special and rare disease: part of his left hemisphere, including his Broca's and Wernicke's areas, were missing. The little boy was incapable of articulate speech; yet his level of sentence comprehension, measured in terms of a picture selection test, corresponded to that of a five-year-old child of normal development. He was furthermore able to discriminate sounds to a limited degree; his performance in the relevant test reached the level of four-year-olds.

Developmental dysphasia thus means a delay both in speech production and in speech perception and speech comprehension; but a lot more results of experiments and examinations are available with respect to such children's speech production than concerning their mechanisms of speech processing. Our knowledge of their speech perception is very limited; investigations thus far have mainly centred on phonological processing. The present paper tries to characterise the speech perception processes of children who started speaking around age three, that is, children whose first language acquisition began with a delay, but whose hearing and intelligence are both normal. We have chosen nursery pupils and schoolchildren whose linguistic functions exhibit no other difference from the normal case and whose articulation problems (if any) concern at most one or two speech sounds. Our aim was to demonstrate that a child with delayed speech, even though his speech production has subsequently improved to normal level, keeps on falling short of age-bound expectations with respect to his perception processes for quite a number of years. In other words, developmental dysphasia as a certain degree of impairment of first language acquisition continues to exist. Our hypothesis is that the dissociation between mother-tongue production and perception, rather than disappearing, becomes even more pronounced after the child's speech production has become normal. It appears that the child comes to meet age requirements in his speech production "at the expense of" his processes of speech perception. We assumed that developmental dysphasia initially just means a simple delay and that it is in cases where it continues to exist for a long time that it turns into an actual impairment. This hypothesis is connected with the relative independence of speech perception from speech production in a way that, in cases of impairment, these two processes develop a lot more differently than in normal language acquisition. Our psycholinguistic approach pays attention to both production and perception since for a child with speech problems both may be the primary source of the deficit. Figure 1 (overleaf) illustrates the scheme of interdependence of production and perception (based on Stackhouse–Wells 1997). If our hypothesis turns out to be confirmed, then this has great practical significance, too. If the process followed by these children is the same as it is with normally developing children but delayed, then training based on the normal language acquisition process is appropriate. If it is not, but in fact is deviant, then the training procedures should be patterned according to specific needs (Ludlow 1980b).

## 2. Method, material, and subjects

In our experiments, we have used five perception tests (GMP2, GMP4, GMP5, GMP10, GMP18) of the GMP standardised diagnostics package for the examination of speech perception and comprehension (Gósy 1999a). The first four of these specifically and quasi-separately examine the acoustic, phonetic, and phonological levels of the speech perception process (using test sentences) and serial perception (using nonsense sound sequences), respectively, whereas the fifth probes transformational perception performance. Although the child has to repeat sentences in some of these tests, this task does not require him to understand the sentences or reconstruct their grammatical forms. The materials of the individual tests were compiled in harmony with the classical procedures of speech perception tests (Neijenhuis et al. 1999). GMP2 is an examination of the acoustic level of speech perception. The language material consists of ten sentences tape recorded as spoken by a male announcer, then masked by white noise (the signal-to-noise ratio is 4 dB on average). The age-required level of correct recognition of the sentences witnesses the normal working of this component process. The task of the child is the immediate repetition of the noise-masked sentence. Examples: *A repülőgép most szállt le* 'The aeroplane has just landed', *Az őzikét kergeti az oroszlán* 'The roe is being chased by the lion'. The expected values are 80% for a five-year-old, and 90% for a six-year-old child. From age seven onwards, all ten sentences are expected to be repeated correctly. GMP4 is an examination of the phonetic

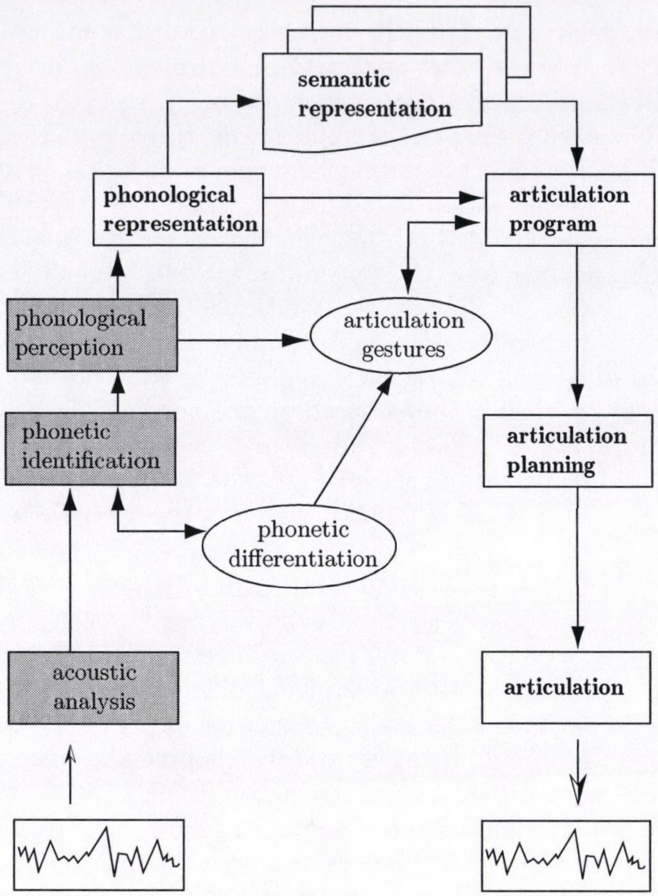


*Fig. 1*
The assumed interaction of speech production and speech perception
(based on Stackhouse–Wells 1997)

level of speech perception. The language material of this test also consists of ten sentences tape recorded as spoken by the same male announcer (e.g., *A vonat nyolc órakor indul* 'The train starts at eight o'clock', *Kapcsold be a televíziót*! 'Turn on the TV!'). The ten sentences were filtered using a CSL 4300B digital signal processing system such that the useful frequency range was roughly 1000 Hz wide (pass-band filtration between 2200 Hz and 2700 Hz, the filter slope was 18 octave/s). By having the sentences repeated, it is possible to evaluate the identification by the child of the specific acoustic cues of the speech sounds as well as their integration into phonetic processing (cf. Ball 1995). The expected value is 100% already from the age of five. There are various tasks to evaluate the child's phonological awareness (cf. Stackhouse–Wells 1997). In the present experiment, two tests serve this, GMP5 tests phonological processing in the strict sense, whereas GMP10 tests seriality. The language material of GMP5 consists of ten sentences tape recorded as spoken by a male announcer, then artificially speeded up by 25%. The average tempo of the ten sentences thus became 14 sounds/s, somewhat faster than the average Standard Hungarian speech tempo (for comparison: the attested limiting values of the articulation tempo of 9–12-year-old native Hungarian children are 8.9 to 13.7 sounds/s, cf. Menyhárt 2002). The meaning and/or grammatical structure of half of the sentences are such that they generally surpass the linguistic knowledge of 5–9-year-old children (e.g., *Őt is beidézték a tárgyalásra?* 'Has he also been subpoenaed for the court hearing?', *Átkokat szórt mások fejére* 'He hailed down curses on other people's heads'). The purpose of this deliberate limitation of the levels of meaning and associations is to make the child take advantage of his lower levels of speech perception to a larger extent. The expected values are 80% for a five-year-old, 90% for a six-year-old, and 100% for a seven-year-old (or older) child. GMP10 examines serial perception. Ten nonsense sound sequences (*menelékej*, *siszidami*, *zseréb*, etc.) are to be repeated by the child in order for us to examine the interrelation of his speech perception and speech production systems. The test situation is similar to the real-life situation in which the child hears a new word and tries to say it for the first time. Already at the age of five, the child is expected to perform almost perfectly (90%); from age six onwards, the standard value is 100%. Finally, GMP18 checks up on transformational perception. The test uses twelve coloured cubes. The child is presented with all the cubes, then one of them is identified with the consonant [p]. When the child has understood the relation between the cube and the consonant, there are further tasks to check if his transformational perception reaches the expected level. The test consists of four parts with increasingly complex tasks in which seriality, speech sound identification, differentiation, and direction recognition are all crucially involved (the trigger sequences in the four parts are [p, p]; [p, oː]; [oː, p]; and [b, oː, p, øː], respectively).

The tests were performed individually, lasting an average of 18 minutes per child.

The number of subjects was **a total of 150 children**, in five age groups (5, 6, 7, 9, and 10-year-olds), 30 subjects per group. The five- and six-year-olds were nursery pupils, the seven-year-olds attended the first form of various primary schools. The nine- and ten-year-olds were third- and fourth-formers, respectively. In the families of the children examined, similar problems of linguistic development did not occur. All subjects were of normal hearing and intelligence (the former point was checked using the GOH hearing screening procedure based on synthesized speech, cf. Gósy 1992; 1999b). First language acquisition started at around age three with all of them; before that, they used just a couple of words and hand-signs. Most of the children were boys, but the genders were represented diversely in the various age groups (the number of boys was 25 in the five-year-old group, 21 in the six-year-old group, 20 in the seven-year-old group, 16 in the nine-year-old group, and 20 in the ten-year-old group). We did not try to reach a balanced representation of boys vs. girls; in this way, the figures also indicate the observed distribution of the impairment across genders in the given age groups.

Some of the children examined still had a speech defect at the time of the experiment. This concerned exclusively the accuracy of articulation (they did not have any other speech defect); it was observable to a higher degree with the five- and six-year-olds (in almost 80% and 60%, respectively), whereas a mere 27% of seven-year-olds, 22% of nine-year-olds, and 9% of ten-year-olds had this problem. The pronunciation of vowels was correct with all the children; of the consonants, sibilants and [r] proved to be difficult to articulate correctly. This corresponds to the physiological articulation difficulties observed with Hungarian children in general; however, in normal development, such articulation problems usually cease to exist around age three. More than two thirds of the participants (83.3% of five-year-olds, 73.3% of six-year-olds, 56.6% of seven-year-olds, 80% of nine-year-olds, and 76% of ten-year-olds) underwent speech therapy between 3 and 7 (for an average of three years).

The statistical evaluation of the data was based on the ANOVA procedure and correlation tests carried out in SPSS for Windows 8.0 software package. In all cases confidence level was set at the conventional 95%.

## 3. Results

We have found significant lag behind the age-required level of performance in terms of all perceptual processes. Considering only average values, we can say that five-year-olds merely showed some delay but their performance curve followed that of normal children (Figure 2). From age six onwards, however, what we had is not simply delay but actual impairment (Figure 3), given that the performance curve of our children showed characteristic deviations from the expected normal performance. Acoustic and phonetic perception exhibited lesser lag, but the level of serial and phonological processes was strikingly poor. Compared to those of five-year-olds, the results of the older children "deteriorated"; in other words, the results suggest that five-year-olds performed better than six-year-olds did. In fact, there was some improvement between the two age groups, but in comparison to the level required for their age, the performance of the six-year-olds got worse, i.e., the difference between normally developed and dysphasic children increased.

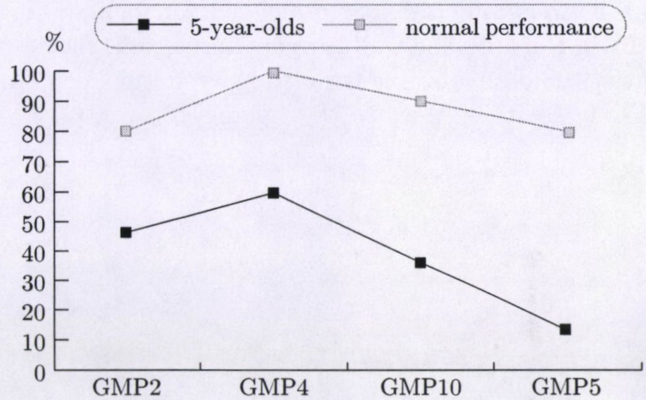


*Fig. 2*
Delayed perception performance of five-year-old dysphasics compared to the expected values

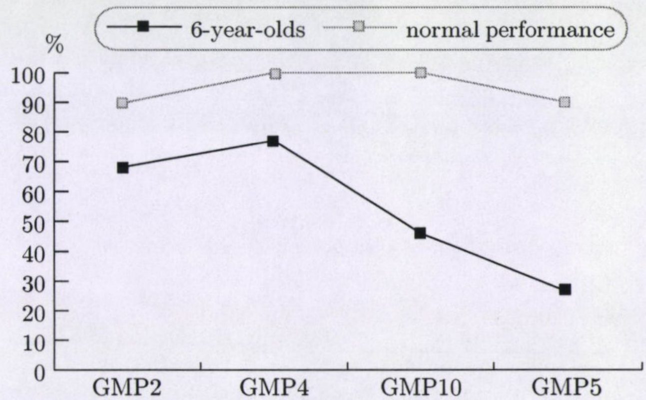


*Fig. 3*
Delayed perception performance of six-year-old dysphasics compared to the expected values

The performance of the schoolchildren also showed significant lag behind that of normally developing children but the performance of the individual age groups exhibited some improvement in all processes (Figure 4). The values for six- and seven-year-olds showed almost no difference, which means that the speech perception levels of nursery school leavers and first-formers were nearly identical, a level that was far behind expectations. Considering the fact that the perceptual processes are responsible for the acquisition of the written language, we must conclude that our first-formers were not in a position to learn how to read and write without problems. Since even nine- and ten-year-olds failed to reach the required levels of a seven-year-old child (!), it is no wonder that various difficulties or deficiencies had been invariably found with all of them in learning the written version of their mother tongue. The descriptive statistical data obtained for the perceptual processes tested are shown in Tables 1–4 with respect to the five age groups.

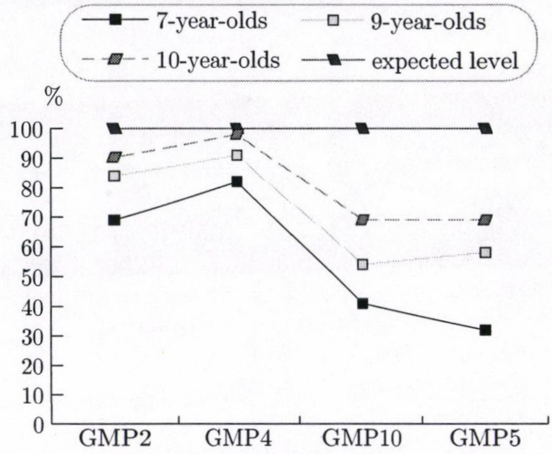


*Fig. 4*
Speech perception performance of dysphasic schoolchildren compared to the expected values

*Table 1*
Statistical data (in percentage) of acoustic perception (GMP2)

| GROUP | MEAN | STD. DEV. |
|---|---|---|
| five-year-olds | 46.33 | 24.42 |
| six-year-olds | 68.33 | 19.84 |
| seven-year-olds | 69 | 25.37 |
| nine-year-olds | 84.33 | 14.54 |
| ten-year-olds | 90.33 | 9.27 |

*Table 2*

Statistical data (in percentage) of phonetic perception (GMP4)

| GROUP | MEAN | STD. DEV. |
|---|---|---|
| five-year-olds | 59.66 | 30.79 |
| six-year-olds | 77 | 30.30 |
| seven-year-olds | 82 | 26.18 |
| nine-year-olds | 91.33 | 13.82 |
| ten-year-olds | 98.33 | 3.79 |

*Table 3*

Statistical data (in percentage) of phonological perception (GMP5)

| GROUP | MEAN | STD. DEV. |
|---|---|---|
| five-year-olds | 13.33 | 17.08 |
| six-year-olds | 26.66 | 20.73 |
| seven-year-olds | 32.33 | 20.45 |
| nine-year-olds | 58 | 19.72 |
| ten-year-olds | 69 | 23.09 |

*Table 4*

Statistical data (in percentage) of serial perception (GMP10)

| GROUP | AVERAGE | STD. DEV. |
|---|---|---|
| five-year-olds | 36 | 24.43 |
| six-year-olds | 46 | 18.49 |
| seven-year-olds | 41.33 | 22.39 |
| nine-year-olds | 54.33 | 20.95 |
| ten-year-olds | 69 | 22.02 |

As witnessed by the tables, individual variation with respect to all processes was great in each age group. It was not infrequently the case that 60% or even 70% differences were found within the same age group, in the same test. This suggests that developmental dysphasia leads on to disturbed functioning of the perception mechanism to widely different extents.

We have analysed potential interrelationships among individual processes of perception. The statistical data revealed a very strong correlation between GMP2, GMP4, and GMP5 ($r = 0.816$); that is, whoever performed well in acoustic perception, would be highly probable to perform at a similar level in phonetic and phonological perception as well. Correlation with serial perception turned out to be significant, too, even if it was less strong ($r = 0.435$). With developmental dysphasic children whose mother tongue was English, strong correlations had been found between timing problems and speech sound discrimination (Tallal–Piercy 1975). Age determined performance to the smallest extent in serial perception ($r = 0.193$); in the other processes, it was a stronger determining factor (correlation can be taken to be medium strong: $r = 0.351$ for GMP2, $r = 0.229$ for GMP4, and $r = 0.511$ for GMP5).

We have also analysed differences among the individual age groups on the basis of their performance in the processes tested. We obtained a significant difference in GMP2 between five-year-olds and the rest of the age groups ($p = 0.000$), between six-year-olds and schoolchildren ($p = 0.014$ and $p = 0.000$), and between seven-year-olds vs. nine- and ten-year-olds ($p = 0.021$, resp. $p = 0.000$). There was no significant difference between six- and seven-year-olds or between nine- and ten-year-olds. In GMP4, significant differences were found between five-year-olds and the older groups ($p = 0.035$, $p = 0.002$, and $p = 0.000$, respectively), between six- and ten-year-olds ($p = 0.000$), as well as between seven-year-olds and nine- and ten-year-olds ($p = 0.021$, $p = 0.000$, respectively). However, there was no significant difference between six-year-olds and seven- or nine-year-olds. Hence, it can be stated that a larger leap of development can be found between the five- and six-year-old age group, as well as, among schoolchildren, between third- and fourth-formers. The statistical results of GMP5 were similar, except that the significant differences occurred at different ages. There was no significant difference between the two nursery groups, between nursery pupils and first-formers ($p = 0.081$ and $p = 0.817$), or between the two oldest groups ($p = 0.221$). Significant differences were found, on the other hand, between nursery pupils and third/fourth-formers ($p = 0.000$), as well as between first- and third/fourth-formers ($p = 0.000$). For GMP10, the differences were usually not significant. Exceptions were those between five-year-olds vs. nine- and ten-year-olds ($p = 0.01$ and $p = 0.000$, respectively) and between six- and seven-year-olds vs. ten-year-olds ($p = 0.000$).

The development of individual processes usually differs across dysphasi- hildren; the data revealed the following points. The results we obtained for the acoustic, phonetic, and phonological levels of speech perception exhibited more similarity with respect to development than those for serial perception. The most gradual development was observable in acoustic perception; for phonetic perception, we found a period of stagnation from seven to ten years of age; whereas phonological perception developed the most spectacularly at seven and nine years. The performance in serial perception did not change until the age of seven, considerable development started only then. We have to add that—in terms of average values—even ten-year-olds failed to reach age-required performance in three out of the four processes examined. We found especially serious lag in phonological and serial perception. Thus, the perceptual processes that are relevant for the unproblematic acquisition of written language (cf. Tallal 1980), did not or did hardly develop until these children started school, a fact that explains the mostly serious difficulties dysphasic children have to face in learning to read and write.

Experience tells us that the articulatory patterns of speech do not necessarily correlate with speech perception performance. This means that the claim that behind all articulatory deficiencies there must be some perceptual deficit as well is not true. However, some articulatory defects do cooccur with problems of perceptual functions. We have analysed whether, within the syndrome of developmental dysphasia, the speech perception processes of children with some speech defect significantly differ from those of children with no such defect. We tried to find out what degree of dissociation between production and perception could be found in the groups we examined. In view of the number of relevant subjects, the performance of six- and seven-year-old subjects with some speech defect (see Table 5) was compared to that of those lacking such defects (the reason was that in the five-year-old group there were too many, whereas in the nine- and ten-year-old group there were too few children with some speech defect, hence comparison in these cases would not have made much sense).

*Table 5*

Correct speech perception by nursery pupils and schoolchildren with and without a speech defect

| TESTS | SIX-YEAR-OLDS | | | | SEVEN-YEAR-OLDS | | | |
|---|---|---|---|---|---|---|---|---|
| | No defect (%) | | Defect (%) | | No defect (%) | | Defect (%) | |
| | Mean | Std. dev. | Mean | Std. dev. | Mean | Std. dev. | Mean | Std. dev. |
| GMP2 | 64.61 | 21.43 | 71.53 | 5.64 | 67 | 11.25 | 71 | 2.76 |
| GMP4 | 77.69 | 28.91 | 74.61 | 9.10 | 76 | 10.77 | 85 | 4.53 |
| GMP5 | 33.84 | 7.55 | 21.53 | 16.75 | 36 | 7.63 | 18 | 4.66 |
| GMP10 | 40 | 18.7 | 47.69 | 5.08 | 45 | 6.7 | 43 | 5.97 |

With six-year-olds, children with a speech defect exhibited somewhat better performance than the others in two perceptual processes, but this difference is statistically not significant. Phonetic and phonological perception, on the other hand, was better with children who had no speech defect (although this difference was not significant, either). With seven-year-olds, the tendency was similar, the perception of children with a speech defect was again slightly better, even in terms of phonetic perception (but the differences were, again, not significant). In phonological perception, however, the performance of children with a speech defect was not only poorer but also significantly so ($p = 0.014$). These results suggest that phonetic and phonological perception are the components that crucially affect the articulatory movements, hence it can be assumed that such perception problems bear on production, too. However, we think that the better perception performance of children with a speech defect was also influenced by the fact that they had received speech therapy (production and perception therapy alike). This may explain the better perception results even in spite of actual speech defects.

The test of transformational perception was carried out with the schoolchildren only, given that a 100% score is only expected here from age seven onwards. In the first three parts of the test, we have not found significant differences in children's performances in any of the three groups. In the fourth part, however, the differences among the groups were significant ($p = 0.001$); 73.37% of seven-year-olds, 53.3% of nine-year-olds, and 30% of ten-year-olds committed errors in solving the task (Figure 5).

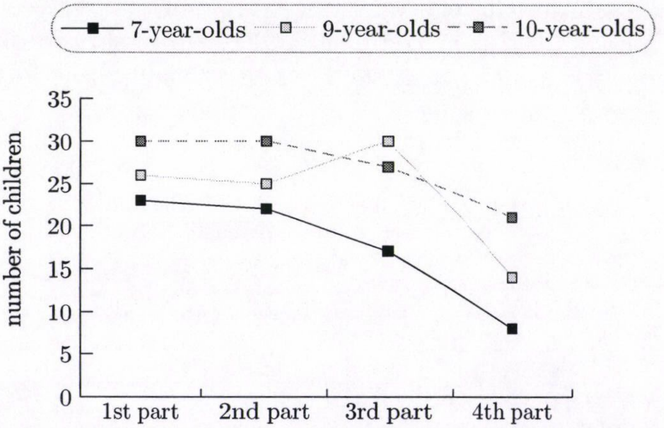


*Fig. 5*
Correct solutions by schoolchildren of the four parts of the transformational perception test

Although the children's performance improved with age, transformational perception that is indispensable for sound–letter identification did not work perfectly in the case of most of our schoolchildren. The fact that their performance was perfect or nearly perfect on the first three subtests shows that the possibility of committing an error increases with the complexity of the task. According to our analyses, transformational perception exhibited strong correlation with performance on the serial perception task in all age groups ($r = 0.429$).

Perception errors mainly showed quantitative differences across age groups; the types of errors, however, were identical or very similar. This unambiguously shows that the relevant perceptual processes were deficient in the same way. The actual errors committed were language specific and concerned various language areas of speech perception: speech sounds, sound sequences, certain parts of speech, suffixes, and erroneous activation of the mental lexicon. Some five/six-year-olds were characteristically unable to repeat the sentences they had heard in full; instead, they repeated more often just the end, less often just the beginning of those sentences. Typical errors committed by both nursery pupils and schoolchildren were the following: fewer syllables repeated (e.g., *terítsék* 'let them lay it' for *terítsétek* 'lay it! (pl.)' or *barlangban* 'in a cave' for *barlangjukban* 'in their cave'), incorrect suffixation (e.g., *kergetik* 'they chase it' for *kergeti* 'he chases it' or *megyünk* 'we go' for *menjünk* 'let us go' or *tárgyalásba* 'into a court hearing' for *tárgyalásra* 'to a court hearing'), omission of a sound (e.g., *ejtsétek* 'drop it! (pl.)' for *fejtsétek* 'solve it! (pl.)' or *ártsatok* 'do harm! (pl.)' for *gyártsatok* 'make! (pl.)'), and omission of a word (*A strand be van zárva* 'The swimming-pool is closed' for *A strand ma be van zárva* 'The swimming-pool is closed today'). Misperceived preverbs were also typical (*szállt fel* 'got on' for *szállt le* 'got off'). Irrespective of their age, children did not hesitate to utter nonsense words in repetition tasks (e.g., *gombó* for *gombod* 'your button' or *selejcsem* for *selejtet* 'spoilage (acc.)' or *balamba* for *A galamb a...* 'The pigeon the...'), sometimes the sequence they returned was only partially nonsensical (e.g., *felesültek* 'they x-ed up' for *felesküdtek* 'they took the oath'). Especially nursery pupils, but also seven-year-olds characteristically had seriality problems; e.g., *Sokat esik tavasszal az eső* for *Tavasszal sokat esik az eső* (both: 'It rains a lot in the spring') or *Dobd a szemétkosárba a papírt* for *Dobd a papírt a szemétkosárba* (both: 'Throw that piece of paper into the wastepaper-basket'). Where the task was the repetition of nonsense sequences, children's performance also showed typical errors due to perception problems—again, irrespective of age. The typical errors were: sound replacements of various types (*seréb* for *zseréb*, *bakögy* for *bakőgy*, *jacolob* for *jacolov*), omission of a sound (*tankün* for *trankün*), metathesis (*sidiszami* for *siszidami*), insertion of a sound (*mendelékhej* for *menelékej*), large-scale distortion of a sound sequence (*piszposzposz* for *kriszposztyüvan*).

## 4. Conclusions

The experimental results have confirmed our assumption that children who start speaking too late will, for quite a few years, remain delayed in their perception processes compared to what is expected at their age, even though their speech production will have greatly improved in the meantime. Therefore, a late-talker is to be regarded as having developmental dysphasia just as long as he shows a deficit, due to the delay, in **any** area of linguistic activity. Our data show that the perception processes of our subjects are delayed/impaired to a statistically relevant extent as compared to those of children who started talking in due time. In terms of phonological perception, those who also have a speech defect exhibit significantly poorer performance even among dysphasic children. The performance of the schoolchildren shows that there is no spontaneous improvement: dissociation can be detected even at the age of ten. In view of the fact that speech perception processes determine the quality of the acquisition of the written form of the mother tongue, the participants of our experiment predictably have/will have problems in learning how to read and write (Stackhouse–Wells 1997). A theoretical upshot of our results is that a close-knit but, in many respects, specifically variable interdependence between phonological representation and articulation program may be justified.

The lasting deficit of perceptual functions that we have found supports the performance-based theory as a causal explanation of developmental dysphasia. We cannot share the view that it is a specific language processing disorder since the fact that perception performance improves with age falsifies this. The assumed dissociation between mother-tongue speech production and speech perception doubtlessly obtains in the cases of developmental dysphasia that we have looked at. What is more, the nature of that dissociation undergoes a change between the ages of five and ten. It is of a lesser magnitude initially: two or three years after the child starts to speak, his delayed perception processes do not exhibit actual impairment (their functioning and relationships merely reflect an earlier stage of development). From school entry age, however, a significant change can be observed in that the dissociation increases and the functional delays turn into functional impairments. The question is whether this is an age-specific feature of developmental dysphasia as a syndrome or else it is a consequence of directed learning and/or the acquisition of the written language. In the first case, the qualitative change of dissociation occurs in all circumstances, whereas in the second, it is triggered by the beginning of schooling. The data seem to confirm the latter possibility. The developmental dysphasic child goes to school with a certain imbalance of production and perception but, in order to perform well at school, he would need the age-specific level of perceptual functions which he falls short of. However, the methods by which the various school skills are formed are suitable for normally developed children, not for dysphasic ones, therefore the development of the latters' perception processes becomes incidental and uncertain. This explains the fact that developmental dysphasia initially just means some delay in the development of the perception mechanism but later it becomes more serious and turns into an actual impairment. The facts emerging from our experimental data support the relative independence of speech production and speech perception, and suggest that their development may be a lot more divergent in case there is some defect than in the case of normal first language acquisition.

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# MULTILINGUAL STATISTICAL TEXT ANALYSIS, ZIPF'S LAW AND HUNGARIAN SPEECH GENERATION*

GÉZA NÉMETH – CSABA ZAINKÓ


## Abstract

The practical challenge of creating a Hungarian e-mail reader has initiated our work on statistical text analysis. The starting point was statistical analysis for automatic discrimination of the language of texts. Later it was extended to automatic re-generation of diacritic signs and more detailed language structure analysis. A parallel study of three different languages—Hungarian, German and English—using text corpora of a similar size gives a possibility for the exploration of both similarities and differences. Corpora of publicly available Internet sources were used. The corpus size was the same (approximately 20 Mbytes, 2.5–3.5 million word forms) for all languages. Besides traditional corpus coverage, word length and occurrence statistics, some new features about prosodic boundaries (sentence initial and final positions, preceding and following a comma) were also computed. Among others, it was found that the coverage of corpora by the most frequent words follows a parallel logarithmic rule for all languages in the 40–85% coverage range, known as Zipf's law in linguistics. The functions are much nearer for English and German than for Hungarian. Further conclusions are also drawn. The language detection and diacritic regeneration applications are discussed in detail with implications on Hungarian speech generation. Diverse further application domains, such as predictive text input, word hyphenation, language modelling in speech recognition, corpus-based speech synthesis, etc. are also foreseen.


## 1. Introduction

As language and speech technology applications gain an increasingly widespread use in several languages/countries, it is important to re-examine the issue of how much difference exists between English (in most cases the first language for both technologies and applications) and other languages. These differences are studied and described in detail in linguistics but they are rarely quantified and used by technology developers.

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In this paper a parallel study of three linguistically different languages—Hungarian, German and English—will be described, using text corpora of a similar size of standard texts and different versions of the Bible. Besides traditional corpus coverage, occurrence statistics, weighted and unweighted word length, some new display properties, features about prosodic boundaries (sentence initial and final positions, preceding and following a comma) were also computed. Examples of applying the above-mentioned results in practical applications will also be given.

## 2. Text corpora

Corpora of publicly available Internet sources was used. Word units are defined as characters between white spaces. It is important to note here that inflected forms of the same root count several times according to this definition. In order to avoid distortions, we tried to filter out asterisks, dashes, slashes, round and square brackets, and other non-relevant characters from corpora. We could not drop all non-real-word strings, because sentence length computations would have been seriously affected. Most of the non-word strings retained are numbers, Roman numbers and abbreviations.

The corpus size of standard texts was the same (approximately 20 Mbytes, 2.5–3.5 million word forms) for all languages. The Hungarian corpus was selected from texts larger than 50 kbytes in the Hungarian Electronic Library (HEL, approximately 2.5 million words). The German corpus was collected from similar material of the Gutenberg project (approximately 3.1 million words). The English corpus was collected from English sections of HEL (approximately 3.5 million words). All corpora contain various texts (literature, newspaper, etc.). The similar size of corpora was a major factor during collection as we wanted to avoid distortions among languages caused by greatly differing coverage and topic domains. For the purpose of comparison, electronic versions of the Bible in Hungarian, German and English were also studied (King James Bible, American Standard Version of the Bible, Elberfelder Bible, Katolikus Biblia).

In order to compare coverage effects, a larger corpus of approximately 80 million words (denoted by Hungarian2) was generated for Hungarian by adding data to the HEL corpus from online newspapers and the Digital Literary Academy (13 million word forms) and combining it with a list of 700,000 words which was derived from up-to-date texts containing 21 million words (Hungarian National Corpus, see Váradi 9). Hungarian2 (80 million word forms) contains approximately 2 million different words. We have also processed derived data from the British National Corpus (BNC, 89 million word forms, see Kilgarriff 2) filtered the same way as the other corpora.

## 3. Statistical analysis

### 3.1. Corpus coverage

Looking at both theoretical studies and practical applications in speech recognition, it seems as if a 20,000 word vocabulary had some magic feature because it is a very frequently used number (sometimes together with language difference warnings, e.g., Gibbon et al. 1, 41–5; Roukos 7). Our results confirm this feature **for English**. Looking at Table 1, it can be seen that such a vocabulary yields a 2.5% theoretical minimum error rate, which coincides with results of other studies. It is important to note, however, that in order to reach the same error rate limit, **German** requires a vocabulary **4 times as large** and it grows by **20 times for Hungarian**.

*Table 1*

Number of most frequent words required by corpus coverage

| LANGUAGE | CORPUS COVERAGE | | |
|---|---|---|---|
| | 75% | 90% | 97.5% |
| English | 1,250 | 5,800 | 20,100 |
| German | 2,000 | 14,550 | 80,000 |
| Hungarian | 10,650 | 70,000 | 400,000 |

Table 2 gives the coverage rate using the 1,000, 20,000 and 100,000 most frequently occurring words in the vocabulary. One reason for the appearance of 20,000 word systems for non-English Western European languages might be that similarly to German, they reach above 90% coverage, which can be acceptable in some cases. It is clear however that an 80% coverage rate is not acceptable in most applications. It is probable that for highly inflecting languages (Hungarian, Finnish and Slavic languages) far larger vocabularies are to be applied if similar processing methods are used as in English. The above 70% coverage of 1,000 words in English might be an explanation why many English teachers claim (at least in Hungary) that flexible and quick use of such a vocabulary is enough for everyday communication in most situations. The same argument may be valid for other quick learning techniques as well.

*Table 2*

Some examples of corpus coverage

| LANGUAGE | NUMBER OF MOST FREQUENT WORDS | | |
|---|---|---|---|
| | 1,000 | 20,000 | 100,000 |
| English | 72.8% | 97.5% | (100%) |
| German | 69.1% | 91.8% | 98.1% |
| Hungarian | 51.8% | 80.7% | 92.0% |

It is a popular tool in computational linguistics to use the frequency-rank distribution plot of text corpora. According to Zipf's law it is supposed that such a plot follows rule (1), where $C$ is a normalising constant and $b$ is around 1.

(1) $freq(rank) = C * rank^{-b}$

Another approximate equation is (2) from Lavalette (see Popescu 6):

(2) $freq(rank) = C * ((rank * maxrank)/(maxrank - rank + 1))^{-b}$

This is better in the range of low frequency items than the original Zipf's law. A comprehensive bibliography of this problem can be found in Li (3). Figure 1 shows the results obtained for our standard text corpora. It can be clearly seen that in the 10–10,000 range there is a close coincidence of English and German, while the slope of the Hungarian curves (which run nearly parallel) is slightly different from both other corpora. The upper and lower regions of all corpora seem to be rather irregular. The slope of the BNC corpus is very similar to that of the smaller Hungarian corpus. The limitations of the original Zipf's law and the Lavalette law are illustrated by fitting them to the similarly large corpora of Hungarian2 and the BNC. It seems that proposed measures for extending Zipf's rule to the whole range are not successful for the corpora we studied.

From a practical point of view, we consider the coverage-rank distribution plot far more useful than the frequency-rank distribution. It is essentially the integral of the ranking plot and normalised to 1. Our results are given in Figure 2. The vertical axis is linear while the horizontal one is logarithmic in order to ensure a display ratio of 1 to 10,000,000. It is an interesting result that in the above 40% range all relatively large corpora (except Hungarian) result in parallel lines. The functions in the 40–85% range could be well approximated by straight lines. The relationship is nearly purely exponential

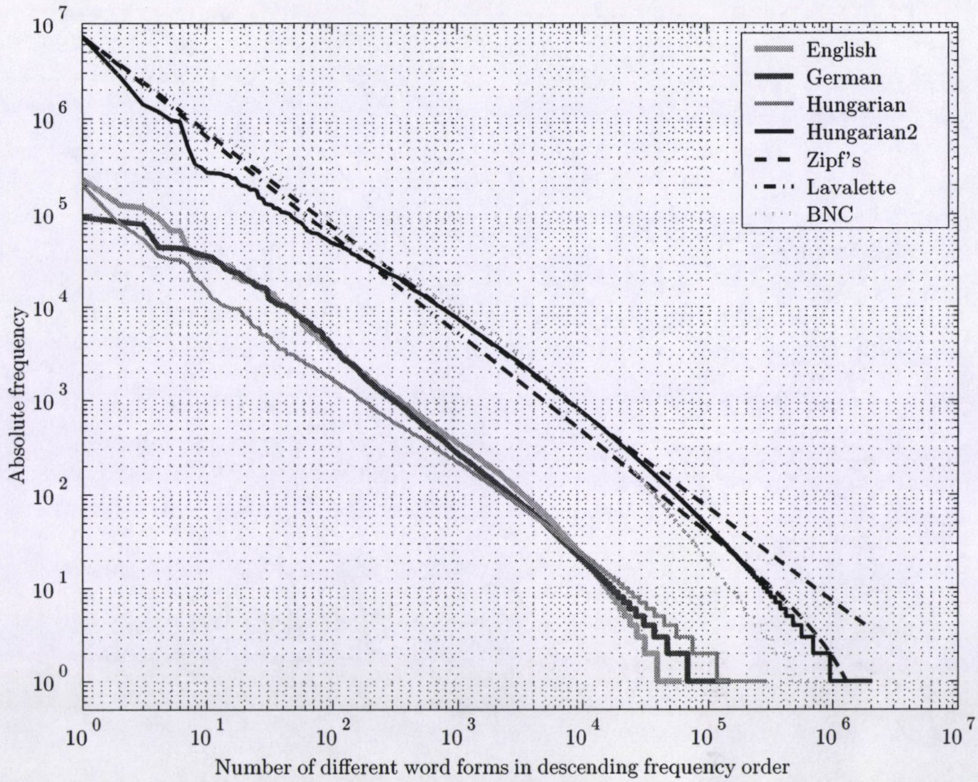


*Fig. 1*
Ranking of standard texts

and follows the Zipfian rule. It is important to note that this is true for the middle range only and that the critical lower and higher ranges are different.

It seems that the Hungarian2, German and English corpora display similar properties as they run parallel above 40%. The German line runs much nearer to the English one than to the Hungarian as expected according to theoretical assumptions. The English corpus differs in coverage by approximately a factor of 2 from the BNC coverage line over 40%, the shape being very similar. The Hungarian corpus seems to be too small to give even approximative results above 95%. It is also clear from the figure that above 95% there is a saturation effect, i.e., disproportionally large number of new words are needed for a small increase in coverage (e.g., for Hungarian2 by approximately doubling the vocabulary—43,000 to 90,000—one can jump from 85%

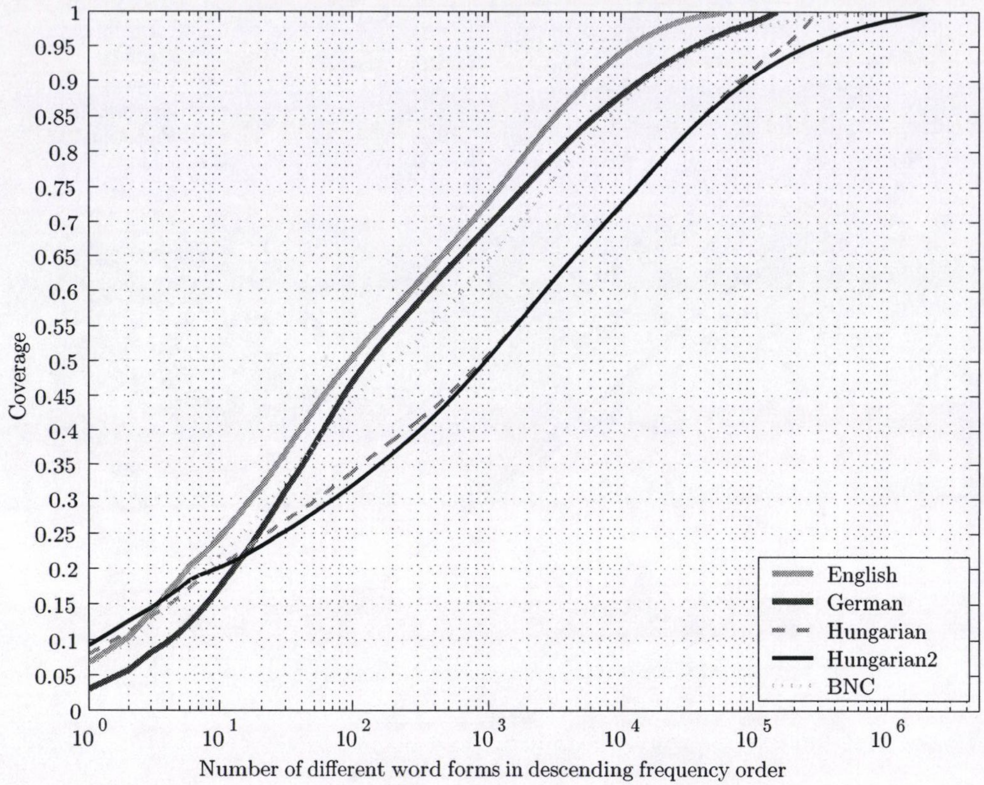


*Fig. 2*
Corpora coverage by the most frequent words
(logarithmic horizontal scale) of standard texts

to 90%, but increasing it from 254,000 to 470,000 raises coverage from 95% to 97% only). Even this section could be well approximated by straight lines on the figure. It may be the case that above 97% Zipf's law could also be applied with a different $b$ constant than in the 40–85% range.

Although three languages are not enough for making generic statements for several languages, it is worth mentioning that the shape of the coverage functions is surprisingly similar above 40%. It might be worthwhile to conduct similar studies for several languages. If the functions are similar, a single measure for comparing language complexity in case of corpora of similar size might be used. We propose a measure of the number of words needed for covering 95% of a sufficiently large, representative corpus of a language. The corpus should be regarded as representative if it reaches the saturation state above 95%. The name of the measure could be COV95. Our COV95 measures for approximately 3 million word corpora (the exact corpus size is the first, the name of the language is the second parameter) are as follows:

(3) COV95 (3.5M, English) = 11,859
COV95 (3.1M, German) = 36,982
COV95 (2.5M, Hungarian) = 168,510

It is also worth looking at the lower end of the figure. The 10 most frequent words cover 15–25%, the first 100 cover 35–50%, while the first 1000 provide 50–75% coverage. This means that in several cases (e.g., diacritic regeneration, speech synthesis, language and keyword detection) careful handling of relatively few words can provide significant improvements.

Figure 3 (overleaf) illustrates a very problematic aspect of corpus based approaches. It is clear that even for English, which contained only 62,000 different word forms in a 3.5 million corpus, nearly 40% of the 62,000 different units (at least 20,000 words) appeared only once in the corpus. So even if one collects a huge corpus for training a system, in case of a real-life application there is a very great probability that quite a few new items (related to the training corpus) will appear. If the corpus is large enough—such as the BNC for English—a very large ratio of rare items will appear only once. For Hungarian the problem is even harder. In a practically convincing case one should collect either such a big corpus that all items should fall in the rightmost column (i.e., appearing at least five times in the corpus) or apply rule-based approaches. Often the combination of both techniques may provide the best solutions.

It is important to note that, although the Hungarian corpora had far more word forms than the German one did, this distribution is very similar for both languages.

### 3.2. Comparative results for English, German and Hungarian Bible versions

In the closed topic domain of the Bible the similarities of English and German have been demonstrated in the frequency-rank plot in the 10–1,500 range. Note, however that even these plots are rather different outside that range. Hungarian displayed largely different properties. The two different English versions (King James Bible, American Standard Version) produced practically indistinguishable results.

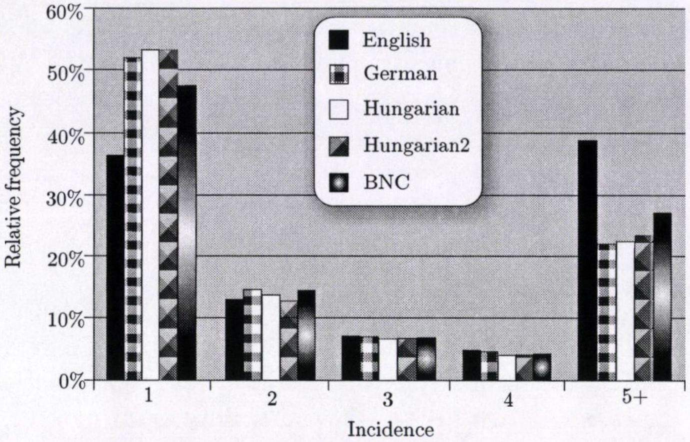


*Fig. 3*
Frequency of occurrences

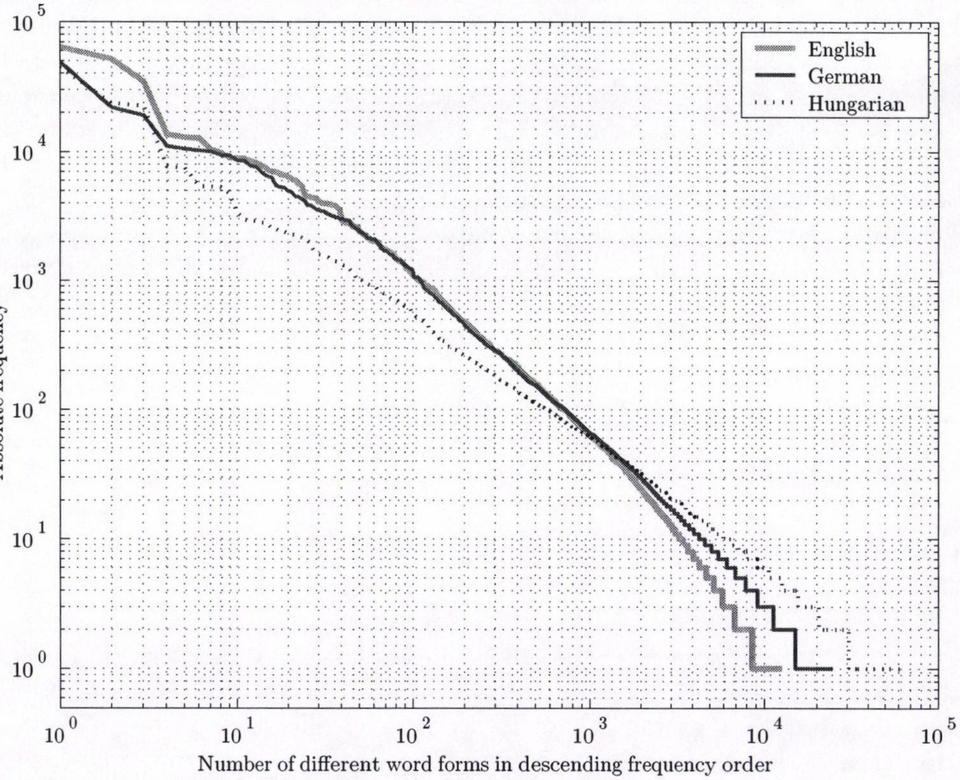


*Fig. 4*
Ranking of Bibles

The coverage-rank distribution of the Bible versions shows very similar properties to the general texts in English and German. The small size of the corpus results in a very distorted function shape for Hungarian.

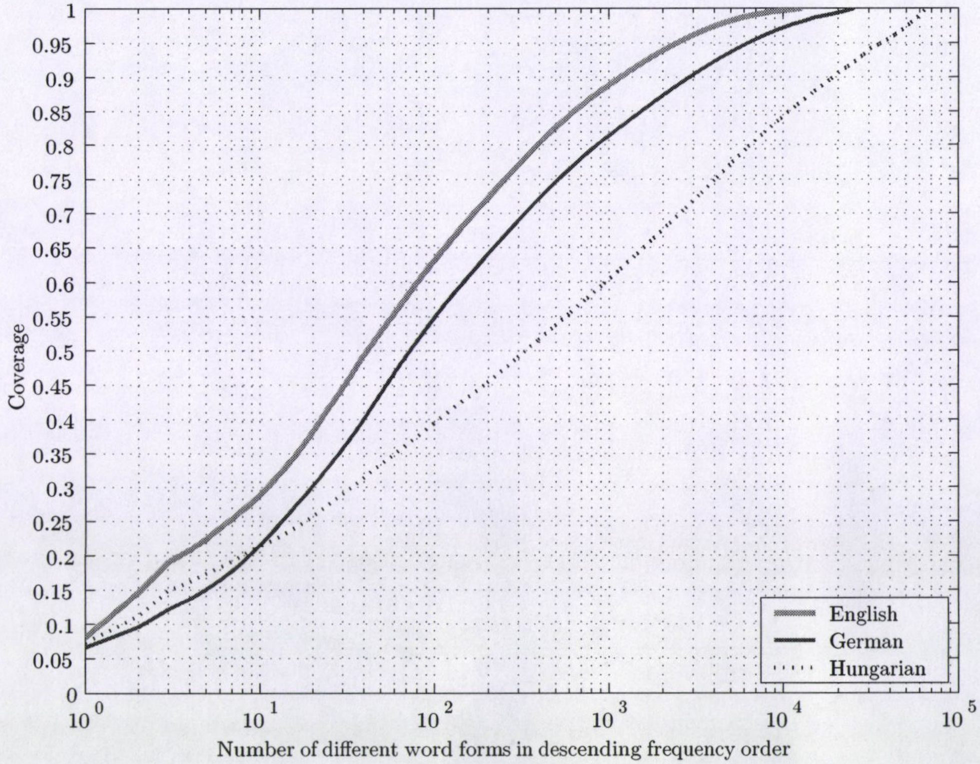


*Fig. 5*
Coverage of Bibles

## 3.3. Word length

Figure 6 (overleaf) gives the word length distributions of our corpora. Lines labelled by W. are weighted distributions (i.e., every word is counted) while the "normal" distributions are calculated from the list of different words. Average values are given in Table 3 (also overleaf). Although word length is an important factor in several domains, we found only one paper (Sojka 8) jointly dealing with word length distribution of English, German and a highly inflecting language, Czech.

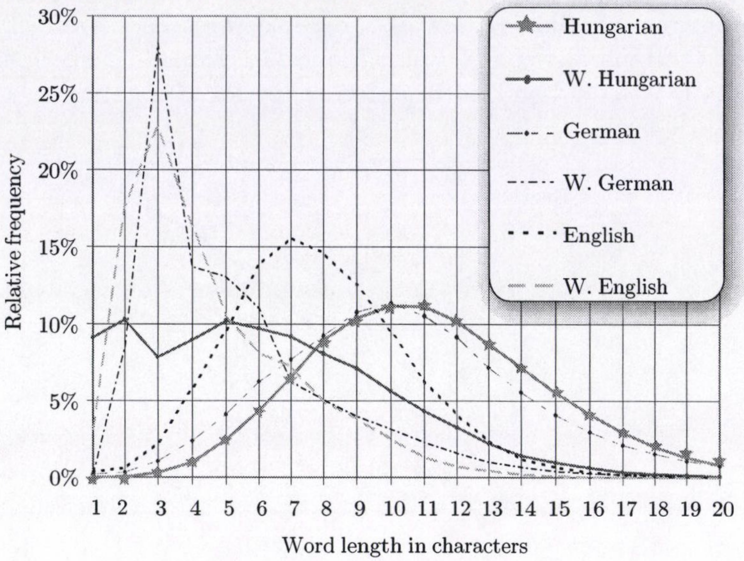


*Fig. 6*

Statistical distributions of word length

*Table 3*

Average word length of the corpora (in characters)

| LANGUAGE | AVERAGE WORD LENGTH | | |
|---|---|---|---|
| | unweighted | weighted | Sojka's results |
| English | 7.85 | 4.57 | 8.93 |
| German | 10.52 | 5.29 | 13.24 |
| Hungarian | 11.21 | 6.24 | 10.55 (Czech) |

The main topic of that paper was compound word hyphenation and word lists were generated from stems by rules. The size of corpora was quite small for English (123,000) and German (368,000) and greater for Czech (3.3M). It is interesting that both the distributions and the average values are very near to ours that come from real running text. The similar results for Czech (Slavic) and Hungarian (Finno-Ugric) are surprising because—besides both being an inflecting language—they have very little in common.

In most practical applications weighted distributions are of greater importance, which **greatly differ** from the "normal" ones (e.g., the "normal" German distribution is nearly identical to Hungarian while the weighted one approximates English).

### 3.4. Sentence statistics

In this section variability of text at easy-to-detect prosodic boundaries (sentence beginning and end, preceding and following commas) is described according to sentence types (statement, question and exclamation) for the three languages studied. Commas and sentence final characters (., !, ?) were used as signs for prosodic boundaries. In our approach listings, for example, are regarded as separate prosodic units. Special word-like units (e.g., abbreviations, numbers, Roman numbers, etc.) were excluded from the occurrence calculations because they could have distorted the results.

It is clear that this approach does not yield perfect results in the narrow grammatical sense. That would require at least a syntactic analyser in a unified framework for the three languages studied. Such a tool is not available for us. It is not important in our case to find all boundaries, we rather concentrate on finding several boundaries which are expressed in human reading. We suppose that our labelling provides such unit boundaries. That was confirmed by visual inspection of corpus samples in the three languages. All corpora contain about an equal number of sentences in each sentence type per language, statements being approximately 10 times as frequent as questions and exclamations. The number of statements is between 114,000 and 134,000 while the number of questions and exclamations varies between 9,000 and 16,000. Further numerical results are given in tables of the Appendix. Our textual analysis is based on bar-graphs with the aim of easier comprehension.

Average word frequency is defined as the ratio of the total number of all analysed words in a position and the number of different words found in the same position. It gives the average value of a word being re-used in a given position. Figure 7 (overleaf) describes the results for statements, questions and exclamations. Five word unit categories (first and last in a sentence, preceding and following commas and the remaining positions) are analysed for the three sentence types.

It seems that English and German statements have a very similar distribution. A word is used nearly twenty times on the average in the initial positions of prosodic units (first in sentence and following comma). The outstandingly high value for the 'other position' column of English statements might be the result of the significantly smaller vocabulary size (see Figure 2). Re-usage of words at the final position of prosodic units (last in sentence and preceding comma) is somewhat higher for English than for German. It is interesting to note that only English and German statements display higher regularity preceding a comma than at the end of the sentence.

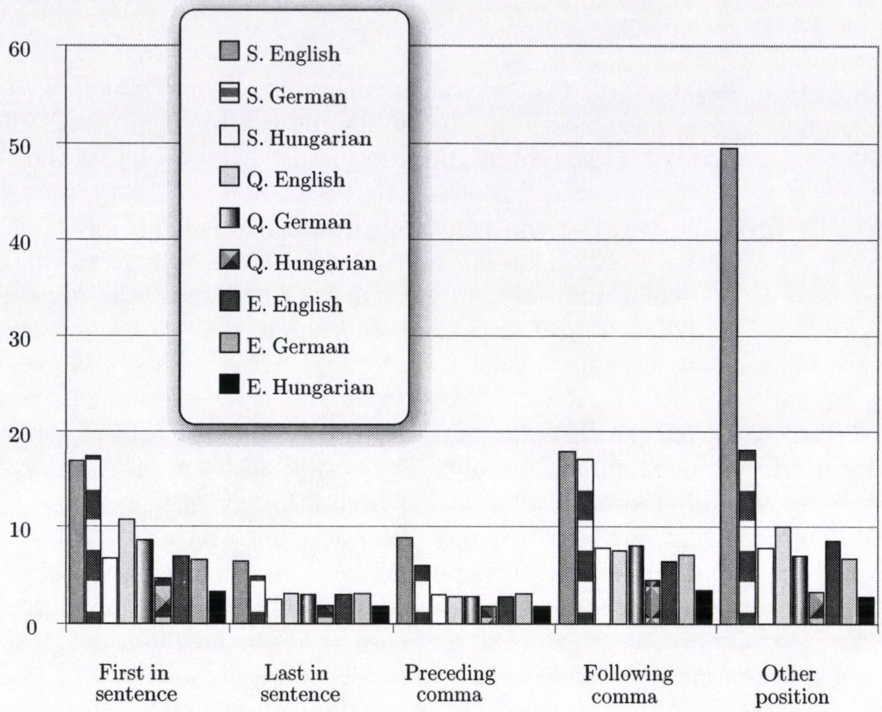


*Fig. 7*
Average word frequency of statements (S), questions (Q) and exclamations (E) in the positions studied

English and German questions also display some similarities. It is surprising that re-usage values are much smaller for questions than for statements. The general opinion is that questions are more structured than statements. Our results contradict this assumption. The difference is the smallest in Hungarian. It is also interesting that German questions after commas have a higher re-usage value that in English. Re-usage at the end of units is very small for all the three languages.

Exclamations are characterised by the smallest amount of re-usage. Values for English and German are very similar. Re-usage values in 'first in sentence' and 'following comma' positions are nearly the same. Hungarian has smaller values but features of the above-mentioned positions are nearly identical.

The values for Hungarian word re-usage are approximately 50% of those for the other languages. This is due to the much higher number of word forms (see e.g., Tables 1 and 2, Figure 2) which is the consequence of the agglutinative nature of the language. This result is in line with our preliminary assumptions.

## 4. Applications

### 4.1. Language detection

The language detection module was developed for an experimental e-mail reading system. A study of real-life e-mail data showed that approximately 40% of the e-mail which is passing through a Hungarian Internet provider contain English only messages. About 56% contains mainly Hungarian text. German e-mail accounts for approximately 3%. This situation requires accurate, automatic prediction of the language(s) used in a given e-mail. The first step for language determination was the creation of word frequency lists from our text corpora. As an example of the results, the twenty most frequent words are given in Table 4 (overleaf). The 100% value is associated with the most frequently used word in a language. The frequency of other words is shown in proportional relationship to this base value.

The data, provided by word frequency lists, cannot be used directly for the detection of languages because there are character combinations appearing in more than one language. Such examples are shown by bold characters in Table 4, e.g., *is* and *in*. Starting from word frequency lists, in the next step a final **list of keywords** was created for each language and these lists were used for language detection. The following rules have been set up for the detection of the language (English, German and Hungarian) of a sentence:

(4) (a) Any sentence containing at least one Hungarian keyword is Hungarian.

(b) The sentence is English if it contains no Hungarian keywords and there are fewer German keywords than English.

(c) The sentence is German if it contains no Hungarian keywords and there are fewer English keywords than German.

(d) If there were no language-related keywords in the sentence, then the language of the sentence is the same as the one which preceded it.

(e) If there were no language-related keywords in the sentence and there is no previous sentence, the sentence is by default Hungarian.

*Table 4*

The first 20 words of the relative frequency list in three languages

| | HUNGARIAN | | ENGLISH | | GERMAN | |
|---|---|---|---|---|---|---|
| | Word | Freq. (%) | Word | Freq. (%) | Word | Freq. (%) |
| 1 | **a** | 100.0 | the | 100.0 | und | 100.0 |
| 2 | az | 35.54 | of | 49.50 | die | 72.39 |
| 3 | hogy | 18.20 | and | 35.15 | der | 69.97 |
| 4 | s | 16.42 | to | 29.81 | sie | 49.16 |
| 5 | nem | 15.76 | **a** | 26.21 | das | 43.09 |
| 6 | **is** | 12.05 | his | 21.58 | er | 42.79 |
| 7 | és | 10.82 | **in** | 20.35 | es | 36.75 |
| 8 | egy | 9.872 | he | 14.16 | **in** | 31.93 |
| 9 | volt | 7.457 | that | 12.82 | war | 31.51 |
| 10 | meg | 6.845 | was | 11.29 | den | 28.86 |
| 11 | azt | 6.307 | with | 10.31 | ich | 24.18 |
| 12 | csak | 5.716 | as | 9.25 | ein | 23.92 |
| 13 | de | 5.713 | their | 8.64 | nicht | 22.51 |
| 14 | ez | 4.837 | it | 8.58 | zu | 22.01 |
| 15 | van | 4.666 | had | 8.41 | aber | 20.76 |
| 16 | ha | 4.470 | by | 7.51 | dem | 19.63 |
| 17 | már | 4.367 | on | 6.66 | auf | 19.42 |
| 18 | még | 4.044 | **is** | 6.54 | mit | 18.52 |
| 19 | el | 3.553 | which | 6.49 | so | 18.06 |
| 20 | mint | 3.525 | for | 6.36 | sich | 16.66 |

It can be seen from the rules in (4) that Hungarian has a preference over foreign languages in this system. For this reason, the Hungarian keywords had to be selected carefully. The number of keywords for English and German had to be approximately the same, to ensure equal detection probability. Let us see an example for possible wrong language detection: <u>My</u> <u>aunt</u> <u>said</u> “Mein Freund hat im Januar Geburtstag”. If only the underlined English words are included in the vocabulary while the German words are not there, the sentence may be incorrectly labelled as English. Such mixed-language sentences need further processing to be developed later.

The current keyword list contains only 97 Hungarian items (because of rules 1 and 5) together with 172 English and 162 German items. The Hungarian section contains two forms, with diacritics and without, as language detection precedes diacritic placement. The accuracy of correct detection of sentences containing more than 10 characters is approximately 96%.

### 4.2. Diacritic regeneration

Letters with diacritics are represented in Hungarian e-mails in several forms but in most cases incorrectly.

*Table 5*

Possible forms of vowels with and without diacritics

| VOWELS WITHOUT DIACRITICS | CORRECT FORMS OF THE 14 VOWELS | NO. OF VERSIONS |
|---|---|---|
| a | a á | 2 |
| e | e é | 2 |
| i | i í | 2 |
| o | o ó ö ő | 4 |
| u | u ú ü ű | 4 |

Table 5 gives the possible combinations of the *a, e, i, o, u* characters in Hungarian e-mails. With increasing number of vowels in a word, the number of possible variations increases quickly.

*Table 6*

Possible forms with different diacritic positions for the word *veres* 'red'

| `veres` | **Veres** az ég. (The sky is **red**) |
|---|---|
| `verés, véres` | A **verés** után ***véres*** lett a háta.<br>(After the **beating** his back became ***bloody***).<br>or<br>A **verés** után ***veres*** lett a háta.<br>(After the **beating** his back became ***red***). |

Table 6 illustrates the three possible meanings which could be generated from the ASCII character string *veres*. The number of possible forms for giving diacritics in a word is given by the formula in (5) where *vno* is the number of vowels in the word:

(5) $2^{vno} \leq word\_forms \leq 4^{vno}$

An example is given in (6); the correct form with diacritics is *megbízhatósága* 'its reliability'.

(6)

| m | e | g | b | i | z | h | a | t | o | s | a | g | a |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | | | 2 | | | 2 | | 4 | | 2 | | 2 |

So this word may be provided with diacritics in $2 \times 2 \times 2 \times 4 \times 2 \times 2$ theoretical forms and only one is correct.

For Hungarian there was no diacritic retrieval software available before the development of our experimental e-mail reading system. Therefore, efforts have been made to combine different available software with our new algorithms for diacritic retrieval. In the experimental e-mail reader version, several combinations have been tested. In the industrial system a version that is based on vocabularies derived from statistically processed Hungarian text corpora was used. The diacritic regeneration vocabulary was derived by processing approximately 80 million words. Words with diacritics (+D) were indexed by their pairs without diacritics (−D). If more than one word had the same −D form, the most frequent +D version was included in the vocabulary. The final vocabulary contains approximately 1.5 million different word forms. It is important to note that this rather large number is the result of the agglutinative nature of Hungarian. Even with this large vocabulary, the probability of correct diacritic regeneration is only around 96%.

In order to reach a real-time solution, in the industrial version only this vocabulary-based solution could be used because more complex linguistic analysis modules were too slow. The memory requirement of the vocabulary database is approximately 40 Mbytes.

### 4.3. Implications for Hungarian speech generation

Speech generation using unlimited vocabularies is not a traditional text-to-speech problem anymore. The language of the text may be unknown, several types of errors (typing errors, lack of diacritics, etc.) might appear in several applications (e-mail reading, news, books, etc.). Users are far more sensitive to errors in the auditory channel than in the visual way. In the latter case during education automatic correction mechanisms are built out.

It is of utmost importance for unlimited vocabulary synthesis that the input text should be as well defined and correct as possible. In order to reach this aim, the error rate of automatic correction mechanisms should be further reduced. New message types (e.g., SMS) present further problems for reading. In these cases users frequently create special abbreviations which are often not known to the general public, so there is no way to prepare reading systems for them. Statistical and rule-based methods might be used for detecting these special text types and present them for interpretation to a human operator.

Our results also show that fully word unit based concatenative speech synthesis is not practical even for English. It was also shown, however, that in all languages prosodic boundaries are marked by frequently used keywords (cf. Figure 7 and tables in the Appendix). It seems to be reasonable to predict that using naturally pronounced units in these positions might improve the overall impression of the listener.

## 5. Conclusions

- All corpora show a very similar coverage distribution which can be well approximated by straight lines on a logarithmic scale (i.e., the number of different word forms exponentially grows if higher text coverage is to be achieved). The original Zipf's law and its improvements are sufficiently correct in a very limited range only.
- The Hungarian vocabulary size is about 5 times greater than German and 20 times greater than English in a corpus of similar **coverage** distribution. If the **size** of the Hungarian corpus is similar to the others (i.e., coverage is smaller) this decreases to 2 and 5, respectively.
- A single measure for comparing language complexity in case of corpora of similar size is proposed. We propose the number of words needed for covering 95% of a sufficiently large, representative corpus of a language. The corpus should be regarded as representative, if it reaches the saturation state above 95%. The name of the measure could be COV95(corpus_size,language). Study of further languages is proposed to verify the usefulness of the proposed measure.
- For Hungarian and German more than 50% of corpus elements appeared only once, which make advance closed training of real-life large vocabulary applications practically impossible.
- "Normal" and weighted word length distributions greatly differ, the average is approximately halved.
- All languages exhibit similarities in the relative structural importance of the five prosodic boundary positions. German and English re-uses word forms to a similar extent in these positions which is about the double of the values for Hungarian.
- Practical open vocabulary applications need to incorporate rule-based linguistic knowledge if the application is complex and/or the error rate

should be low. Language detection and diacritic regeneration applications of our statistical text analysis have been described with an error rate of 5–6%. Smaller error rates can be achieved by increasing the corpus size and including rule based corrections for word sense disambiguation and similar problems.

The results can be applied in such diverse domains as predictive text input, diacritic regeneration from 7bit ASCII unaccented forms, word hyphenation, language modelling in speech recognition, corpus-based speech synthesis, etc. Related aspects of an e-mail reading application are described in detail in Németh et al. (5).

## Appendix

*Table A1*

Hungarian sentence statistics

| | HUNGARIAN | NO. OF WORDS ANALYSED | DIFFERENT WORDS | AVERAGE WORD FREQ. | THIS CAT. / ALL DIFF. WORDS |
|---|---|---|---|---|---|
| STATEMENT | First in sentence | 132411 | 19843 | 6.7 | 7.5% |
| | Last in sentence | 132123 | 52358 | 2.5 | 19.8% |
| | Preceding comma | 253887 | 84001 | 3.0 | 31.8% |
| | Following comma | 231739 | 29862 | 7.8 | 11.3% |
| | Other position | 1555475 | 198742 | 7.8 | 75.2% |
| | Distribution ratio | | 1.46 | | |
| | Full sub-corpus | 2305635 | 264415 | 8.7 | 100.0% |
| QUESTION | First in sentence | 12446 | 2661 | 4.7 | 8.4% |
| | Last in sentence | 12441 | 6541 | 1.9 | 20.6% |
| | Preceding comma | 13520 | 7408 | 1.8 | 23.3% |
| | Following comma | 11632 | 2612 | 4.5 | 8.2% |
| | Other position | 71050 | 21831 | 3.3 | 68.8% |
| | Distribution ratio | | 1.29 | | |
| | Full sub-corpus | 121089 | 31729 | 3.8 | 100.0% |
| EXCLAMATION | First in sentence | 11192 | 3370 | 3.3 | 11.3% |
| | Last in sentence | 11175 | 6120 | 1.8 | 20.5% |
| | Preceding comma | 14117 | 7905 | 1.8 | 26.4% |
| | Following comma | 11423 | 3264 | 3.5 | 10.9% |
| | Other position | 54246 | 19053 | 2.8 | 63.7% |
| | Distribution ratio | | 1.33 | | |
| | Full sub-corpus | 102153 | 29909 | 3.4 | 100.0% |
| ALTOGETHER | | 2516648 | 281214 | 8.9 | |

Each table contains data for a particular language. Five word unit categories (first and last in a sentence, preceding and following commas and the remaining positions) are analysed for the three sentence types. The sentence type is given in the 1st column. The first 5 rows for each sentence type give statistics for the given position. Row 6 for a sentence type is the ratio of the sum of the different words in the 5 positions and the number of different words in the given sub-corpus (e.g., 6764+17926+29692+13145+49872/60469 yield 1.94 in Table A3). Row 7 contains information related to the full sub-corpus of the given sentence type. The last row of each table contains total values for the given language. Column 2 contains short reminders to data types. Column 3 gives the total number of analysed words found in a certain position (it is equal to the number of sentences of the given sentence type). Column 4 contains the number of different words in a position of a sentence type. Column 5 gives the average number of use of a word in a given position (ratio of column 3 and 4). Column 6 is the ratio of column 4 and the number of different words in a sentence type (column 4, row 7). The percentage values of column 6 of a sentence type do not sum up to 100% because the same word of the corpus might appear in several positions.

*Table A2*

German sentence statistics

| | GERMAN | NO. OF WORDS ANALYSED | DIFFERENT WORDS | AVERAGE WORD FREQ. | THIS CAT. / ALL DIFF. WORDS |
|---|---|---|---|---|---|
| STATEMENT | First in sentence | 133462 | 7659 | 17.4 | 5.6% |
| | Last in sentence | 133420 | 26970 | 4.9 | 19.8% |
| | Preceding comma | 258889 | 43485 | 6.0 | 32.0% |
| | Following comma | 247174 | 14497 | 17.1 | 10.7% |
| | Other position | 2002630 | 110602 | 18.1 | 81.4% |
| | Distribution ratio | | 1.50 | | |
| | Full sub-corpus | 2775575 | 135924 | 20.4 | 100.0% |
| QUESTION | First in sentence | 13976 | 1625 | 8.6 | 7.6% |
| | Last in sentence | 13975 | 4637 | 3.0 | 21.8% |
| | Preceding comma | 16599 | 5884 | 2.8 | 27.6% |
| | Following comma | 14793 | 1838 | 8.0 | 8.6% |
| | Other position | 112794 | 16134 | 7.0 | 75.8% |
| | Distribution ratio | | 1.41 | | |
| | Full sub-corpus | 172137 | 21291 | 8.1 | 100.0% |
| EXCLAMATION | First in sentence | 16029 | 2420 | 6.6 | 10.8% |
| | Last in sentence | 16012 | 5243 | 3.1 | 23.4% |
| | Preceding comma | 19779 | 6474 | 3.1 | 28.9% |
| | Following comma | 16636 | 2344 | 7.1 | 10.4% |
| | Other position | 111618 | 16552 | 6.7 | 73.8% |
| | Distribution ratio | | 1.47 | | |
| | Full sub-corpus | 180074 | 22440 | 8.0 | 100.0% |
| ALTOGETHER | | 3117661 | 143778 | 21.7 | |

*Table A3*

English sentence statistics

| | ENGLISH | NO. OF WORDS ANALYSED | DIFFERENT WORDS | AVERAGE WORD FREQ. | THIS CAT. / ALL DIFF. WORDS |
|---|---|---|---|---|---|
| STATEMENT | First in sentence | 114410 | 6764 | 16.9 | 11.2% |
| | Last in sentence | 114292 | 17926 | 6.4 | 29.6% |
| | Preceding comma | 261544 | 29692 | 8.8 | 49.1% |
| | Following comma | 235750 | 13145 | 17.9 | 21.7% |
| | Other position | 2470432 | 49872 | 49.5 | 82.5% |
| | Distribution ratio | | 1.94 | | 0.0% |
| | Full sub-corpus | 3196428 | 60469 | 52.9 | 100.0% |
| QUESTION | First in sentence | 9228 | 863 | 10.7 | 6.7% |
| | Last in sentence | 9228 | 3019 | 3.1 | 23.4% |
| | Preceding comma | 11304 | 4018 | 2.8 | 31.1% |
| | Following comma | 9742 | 1299 | 7.5 | 10.1% |
| | Other position | 102012 | 10232 | 10.0 | 79.2% |
| | Distribution ratio | | 1.50 | | |
| | Full sub-corpus | 141514 | 12912 | 11.0 | 100.0% |
| EXCLAMATION | First in sentence | 8816 | 1282 | 6.9 | 9.8% |
| | Last in sentence | 8812 | 2940 | 3.0 | 22.4% |
| | Preceding comma | 12101 | 4309 | 2.8 | 32.8% |
| | Following comma | 10169 | 1600 | 6.4 | 12.2% |
| | Other position | 86513 | 10137 | 8.5 | 77.2% |
| | Distribution ratio | | 1.54 | | |
| | Full sub-corpus | 126411 | 13131 | 9.6 | 100.0% |
| ALTOGETHER | | 3458856 | 62501 | 55.3 | |

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# PHONETIC TRANSCRIPTION IN AUTOMATIC SPEECH RECOGNITION*

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## Abstract

This paper discusses automatic phonetic transcription to be applied in Hungarian speech recognition. It first deals with the basic technologies of automatic speech recognition (ASR) for the sake of readers not familiar with this scientific field, then it discusses the place of (automatic) phonetic transcription in ASR. After that, our method developed for transcribing Hungarian texts automatically is introduced. This technique is an extension of the traditional linear transcription approach; its output is called 'optioned' because it contains pronunciation options in parallel arcs. We present our experiences with promising improvements in recogniser training efficiency. The achievements are due to the application of deeper linguistic (phonological) knowledge. With the training technique developed not only the quality of the acoustic models can be enhanced, but also, at the same time, the amount of the required manual work can effectively be decreased.


## 1. Introduction

Automatic speech recognition (ASR) has been an extensively researched area in the past few decades, and now it has reached the level of practical applicability and is already used, mainly in telephony applications. Currently the best technology is phone-based, therefore the words to be recognised have to be transcribed into phone sequences; this process will be called phonetic transcription, which has a significant role in ASR as it will be shown.

The operation of modern recognisers is based on statistical models, which is, perhaps, their most important feature. This means that the characteristics of the basic phone units (which are often called acoustic models, i.e., the models of the speech sounds) are estimated using large speech databases recorded from hundreds or thousands of speakers. In other words, the most successful ASR approach is somewhat similar to the human method: "First teach it, then use it!". A key point in teaching a speech recogniser (estimating the

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parameters of the acoustic models) is the need for the phonetic transcription of the recorded training speech.

Some training algorithms require not only the uttered phone sequence, i.e., the phonetic transcription, but also the time boundaries of the speech sounds. Based on the transcription and some initial acoustic models, the time boundaries can be generated using a special technique called "forced alignment", which will be discussed later. Nevertheless, a large amount of spoken text has to be transcribed phonetically. This is a time-consuming, tedious work for a human (and so it is an expensive procedure). Since Hungarian orthography and pronunciation are in relatively close correspondence, it seemed plausible to automate the process of phonetic transcription as well. However, as we have experienced, the development of a general transcription method for ASR purposes is not a straightforward task.

In this paper we give a very brief introduction to current mainstream speech recognition technology, and show the place of phonetic transcription in automatic speech recognition. The problems of automatic phonetic transcription (APT) particularly for ASR are discussed, namely alternative pronunciation options, and the behaviour of adjacent consonants at morpheme or word boundaries. Then we propose a method for isolated-word APT, extend it for training texts and finally present our experimental results on isolated-word recognition tasks.

For the sake of linguist readers, some explanations have to be given here to avoid misunderstandings concerning some terms. First of all, we use the term 'phoneme' in the generative phonology sense, and for speech sounds the expression 'phone' will be used. When dealing with APT, we focus on the investigation and modelling of (alternative) phonetic transcriptions resulting from the interaction of adjacent phonemes (e.g., *egyszáz* → [ɛ c s aː z], [ɛ tsː aː z] 'one hundred'), which can be described more or less by pronunciation rules. The phenomena in which the construction of the phonetic transcription(s) is based on exception-like rules or no rules at all (e.g., *szőlő* → [s ø lː øː] 'grapes' or *Ft* → [f o r i n t] 'HUF') are typically ignored here. It should be mentioned that instead of dealing with the motivation for the phonological process involved, we consider the subject of phonetic transcription from an engineering point of view. So our main criterion is whether the application of a certain kind of phonetic transcription technique decreases the recognition error rate or not, as compared to another PT procedure.

## 2. A few words about automatic speech recognition

As mentioned earlier, today's most successful ASR technology is a statistics-based one, often referred to as "Hidden Markov-Model" technique. The core of this technology is that every speech sound has one (or more) simple model(s) and these phone-models are joined to each other depending on the recognition task resulting in a "big" Hidden Markov-Model. This composite HMM is a directed graph, which always has a starting and an ending node, and is able to recognise any possible phone sequence, which represents a path between the start and the end nodes.

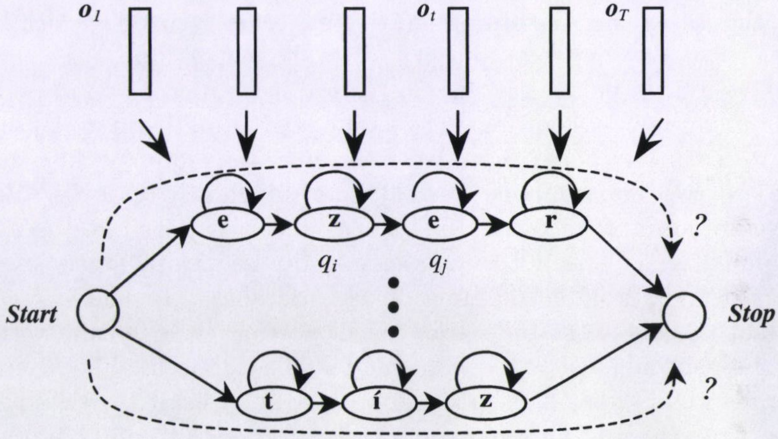


*Fig. 1*
Illustration of HMM-based isolated-word number recognition (*ezer* [ɛ z ɛ r] 'thousand', ..., *tíz* [t iː z] 'ten' are parallel branches representing recognition alternatives)

### 2.1. Recognition

First the sound (the intensity change of the air pressure) is converted to an electromagnetic signal by a microphone, and then it is digitised to provide a "comprehensible" input for the computer. An acoustic pre-processing step follows, which aims to transform the waveform into a frequency-domain signal—similarly to pre-processing in the human ear. The result is a sequence (equally spaced in time) of feature vectors (o1, o2, ..., oT), where each vector acoustically characterises the respective 30 ms long part of the speech signal.

The main task of the recogniser is to choose the best (most likely) path between the start and end nodes according to the actual feature vector of the sequence. Each phone-model has its own "similarity" function, so the simplest way of operation is to measure the similarity (or likelihood) for each feature vector in each phone-model and then choose the most likely phone sequence from all possible paths. An efficient implementation of this method is the Viterbi algorithm (Rabiner–Juang 1993).

## 2.2. Training of acoustic models

In order to be able to compute the likelihood of a feature vector in a phone model, the likelihood function of the sound model must be estimated in some way. This estimation process is called the "training of acoustic models". Generally the Maximum Likelihood (ML) criterion is used, which can be illustrated by the following example: if we would like to estimate the likelihood function of the phone-model [ɔ], then in general it is expected to respond with the maximum value in case of feature vectors originating from an [ɔ] sound as compared to feature vectors originated from any other sound ([aː], [ b ], . . . ).

There are two main approaches to performing such training. Both require a large amount of recorded speech—as much as possible—because the likelihood functions to be determined are estimated from statistics of feature vectors derived from a (training) speech database. In the first case the boundaries of the speech sounds are needed, so that each feature vector can be unambiguously mapped to a phone-model. Then, the likelihood functions of the phone-models can be estimated one by one typically with a K-means algorithm as mixtures of Gaussian functions (Rabiner–Juang 1993). To refine the estimation, the so-called Viterbi realignment is used (Young et al. 2000). Training within this approach is relatively effective in terms of quality of acoustic models and convergence speed; it requires, however, not only the uttered phone sequence but the exact boundaries of the speech sounds, too.

The other widely used training method is the embedded Baum–Welch re-estimation procedure (Young et al. 2000). An important characteristic of this approach is that it does not need any information about the boundaries of the speech sounds, because it determines them implicitly and iteratively. So, this procedure requires only the uttered phone sequence—the phonetic transcription—of the recorded training speech. This is an advantage as compared to the previous approach, but this embedded training can be very slow as it estimates the phone-model functions simultaneously and may require many iterations. Actually, the embedded training iterations generally follow a K-means and Viterbi-training to further refine the acoustic models.

### 2.3. Forced alignment

This is a frequently mentioned technique which deserves to be described in a little more detail. In fact, the basic forced alignment method is an extremely simplified recognition procedure aiming only at the segmentation of the input speech signal, based on its phonetic transcription. The way of doing this is the following: according to the precise phonetic transcription of the input speech the phone-models are sequentially joined to each other resulting in a **linear** hidden Markov-model. This HMM is used for recognising the input speech utterance. (Actually, the recogniser has no other choice than to recognise the actual given phone sequence, therefore it is called "forced" alignment). Thus, the result of the recognition is trivial (there is only one path between the start and end nodes), we use only the side effect of the recognition process, namely the mapping of every feature vector to a phone-model whereby the input speech is segmented on the phone level.

In this way, such a simple recognition procedure is able to determine the boundaries of the sounds in the speech sample using only phonetic transcription. (Of course, some trained initial acoustic models are needed for the recognition, too. They can be based on a small amount of manually labelled data, which requires only a limited amount of work.)

Now it can be seen why forced alignment was mentioned above: we can conclude that the phonetic transcription of training sentences cannot be avoided, unless the phone segmentation of the complete training material is performed (entirely) manually.

## 3. The relation between recognition tasks and automatic phonetic transcription

### 3.1. Isolated-word recognition

Let us consider now where and how it is necessary or profitable to apply automatic phonetic transcription in ASR. The first evident application area is isolated-word recognition. Isolated-word recognition means that only one utterance (typically one word or phrase) should be recognised at one attempt. In other words, the utterance has a definite start and a definite end and no longer pauses occur between them. In this case, assuming that the acoustic models are already trained, the main task in constructing a recogniser is to perform the phonetic segmentation of the words to be recognised. An important point here is that if one word has more than one possible correct pronunciations, then, of course, all correct phonetic transcription versions should be presented to the recogniser. As the vocabulary size, i.e., the number of words to be recognised, can be several thousands (e.g., in one of our applications, a Hungarian city-name recogniser) it may be worth the effort to do the phonetic transcriptions automatically. A further advantage of the automatic method is that the phonetic transcriptions can easily be converted into pronunciation networks, which are effective forms of vocabulary representation considering recognition speed and memory load.

### 3.2. Recogniser training

Another ASR field where APT can promisingly be applied is recogniser training. As mentioned earlier, the recorded words and sentences have to be accompanied by their correct phonetic transcription in the training phase. There are many possible ways to produce phonetic transcriptions. Perhaps one of the highest quality solutions is to listen to all recordings and do each and every phonetic transcription "by ear". This approach has a great advantage: independently of the written text, the actual, **uttered** phone sequence is recorded which otherwise might not be the case due to misreading. But as usual, the "human factor" causes failures, too. This kind of transcription technique, however, requires a qualified employee with excellent hearing abilities, also the work is very monotonous and tiresome. So, considering the quite large amount of speech data (some 100 hours or more) this is a really expensive method. In a variant of the previous system, an automatic phonetic transcription—based on the known read text—is made first, and the human's task is merely to modify the (automatic) transcription if necessary after listening to the recorded speech material. (Remark: currently for Hungarian—as well as for other languages—the large majority of training materials are read speech, so the source text is generally available.) This variant may result in faster work than the previous one, but the automatically generated phone transcriptions might bias the listener.

The other approach is to do the phonetic transcriptions fully automatically, based on the read text. Undoubtedly, once an APT technique is readily available, this is the fastest and the most inexpensive way, but of course, as the "printed" and "spoken" text may differ from each other, the automatically made phonetic transcription will contain errors. In a variant of this system, a manual correction on the source text is made first after a quick listening to the recordings. The aim of this step is to repair or indicate the evident errors made during the reading (such as misreading, stopping in the middle of the word, hesitation, etc.). This step is frequently called 'annotation' and requires much less human work than the correction of APT errors. The automatic phonetic transcription of an annotated text may be close to a manual transcription of the same text.

However, there is a theoretical difficulty with the automatic generation of the (guessed) uttered phone sequence, similarly to the transcription of vocabulary elements in isolated-word recognition. That is, the actual utterance realisation of a read text cannot be fully predicted in advance, because very often variations can occur in the way it is pronounced. While for distinct (isolated) words the number of alternative phonetic realisations is generally one or two, the number of possible pronunciations of a complete sentence is much higher. The reason, the source of the variation, is not only that a sentence includes a number of words and so, trivially, the word variations are multiplied by one another. Additional phenomena are the optional pauses between words and the phonological interactions at word boundaries. However, in the case of training sentences, the real difficulty is that the options cannot be directly represented because the training algorithms need an actual linear phone sequence, as opposed to isolated-word recognitions.

We have recently elaborated a special technique to solve the problem addressed. Our method is the following: first a special—we call it 'optioned'—phonetic transcription is generated automatically from the annotated source text for every sentence. This kind of transcription contains parallel phone sequence options allowing for alternative pronunciations.

(1) ILLUSTRATION:

(a) Original source text:
*Mit csinálsz, Bandi?* 'What are you doing, Andrew?'

(b) Annotated source text:
*mit csinálsz Bandi*

(c) Possible phonetic transcriptions:
mit□ʧinaːls□bɔndi
miʧinaːls□bɔndi
mit□ʧinaːlzbɔndi
miʧinaːlzbɔndi

(d) Optioned phonetic transcription:
mi⟨t□|⟩ʧinaːl⟨s□|z⟩bɔndi

(In this example, the optioned transcription includes four possible phonetic transcriptions. A pronunciation option begins with '⟨', the alternative phonetic realizations are separated by '|', and the return from an option is denoted by '⟩'. '□' denotes speech silence.)

Then these optioned transcriptions are used for forced alignment. For this method the basic forced alignment method has been extended to handle parallel alternatives. The forced alignment chooses a uniquely estimated phone sequence among all possible pronunciations allowed by the optioned transcription. In this step the time boundaries of the speech sounds are determined, too, but they can be discarded if not needed. So, essentially, the computer is used for listening to the recordings instead of humans.

The question is whether the performance of our method is good enough, and how the "optioned" phonetic transcriptions can be generated automatically. For the answer we had to work in the reverse direction: first we generated the transcriptions automatically and then conducted some experiments to evaluate the efficiency of optioned phonetic transcription from the recognition point of view. The rest of the article is devoted to this issue.

## 4. Automatic phonetic transcription of Hungarian texts

In what follows, we discuss the problems related to automatic phonetic transcription of Hungarian texts, give a method for isolated words and then extend it for training sentences.

### 4.1. Problems

The process of phonetic transcription can be divided into two main steps. The first one is to identify the letters in the input text—with a special care to the multi-character letters, which abound in Hungarian—and then to convert them into phonemes; the result is the canonical phonemic transcription. In the second step, the interactions of adjacent speech sounds or phonemes are taken into account, and so we get the phone sequence(s) of the input word according to its actual pronunciation as an output phonotypical transcription.

#### 4.1.1. First step: segmentation of orthographic words into letters

With respect to automating the segmentation of Hungarian words into letters one has to deal with the following problems:

(i) The identification of multi-character letters in the input word can be ambiguous if higher-level linguistic knowledge is not applied in the source text.

(2) AN EXAMPLE OF THE DECODING AMBIGUITY OF THE *csz* STRING:

(a) *láncszem* → **l á n cs z e m* or *l á n c sz e m* ? 'chain-loop'

(b) *kulcszörgés* → **k u l c sz ö r g é s* or *k u l cs z ö r g é s* ? 'jingle of a key'

(ii) Further difficulties arise when dealing with traditionally spelt or foreign words or acronyms (like *Batthyány* ⟨family name⟩, *e-mail*, *ABC* . . . ). In these cases, it makes no sense to segment the words into letters, obviously they should be handled as exceptions.

So, the first problem to be solved is to identify the letters in the text, and then they can be converted one by one into phonemes.

### 4.1.2. Second step: handling phonological processes

Once the canonical phonemic transcription is arrived at, there is often no need for further processing. However, in many cases the pronounced sequence of phones is different from the canonical form because of the interaction of neighbouring phonemes or speech sounds. Especially the consonants may change, due to assimilations, mergers, etc. These phenomena are widely known and often described as pronunciation rules (Hedvig–Puster 1994).

A difficulty that prevents the direct application of these rules in a computer-based system is that they utilise higher-level linguistic information, which is not available by default. Moreover, the rules sometimes allow more than one correct pronunciation options and it is not trivial how to handle them.

Let us see some examples for the pronunciation ambiguity of phoneme pairs or triplets:

(3) (a) /t j/:
/l aː t j ɔ / → [l aː cː ɔ ] 'can see it'
/aː t j aː r oː/ → [aː t j aː r oː] 'passage'
In the first case, only the pronunciation involving [c ː] is correct, while in the second case only [t j].

(b) /t ʃ/:
/ɔ p aː t ʃ aː g/ → [ɔ p aː ʧː aː g] or [ɔ p aː t ʃ aː g] 'abbey' (Fekete 1992)
Both pronunciations are correct.

(c) /ʃ t/:
/ɛ z y ʃ t/ → [ɛ z y ʃ t] 'silver'
/ɛ z y ʃ t b aː ɲ ɔ/ → [ɛ z y ʒ d b aː ɲ ɔ] 'silver mine' (Fekete 1992)
The sound [b] voices not only the adjacent sound [t], but the more distant [ʃ], too.

(d) /s t g/:
/eː b r ɛ s t g ɛ t/ → [eː b r ɛ z d g ɛ t] or [eː b r ɛ z g ɛ t] 'try to wake'
The [d] can optionally be dropped.

It can be seen that the traditional linear phone sequence output approach that is adequate in speech synthesis cannot be kept in speech recognition. Here, all correct pronunciation options should be represented in some way in the phonetic transcription.

## 4.2. Our automatic phonetic transcription method

In the following sections we introduce a method that is able to transcribe individual (orthographic) words into phonotypical phone sequences including pronunciation options. Also, the majority of the previously outlined problems can be handled within this framework. The main steps of the method are as follows:

### 4.2.1. Morpheme analysis

Most of the problems described above can be handled by taking the morphological structure of words into account. Therefore, the first step of our method is to perform morphological segmentation. The words are passed to a morphological analyser that inserts special symbols at morpheme boundaries. This method was originally proposed by Wothke (1991) and our system uses similar symbols:

(4) = before a stem
+ before a derivational affix
% before an inflectional affix

(5) *kulcszörgés* → =kulcs=zörg+és 'jingle of a key'

### 4.2.2. Identification of letter boundaries

After the boundaries of the morphemes have been determined, the input word can be segmented into letters on a morpheme-by-morpheme basis. This turns out to be a much easier task than segmenting the original word because ambiguous combinations of the letters almost never occur inside morphemes.

Utilising that observation, Hungarian morphemes can be segmented unambiguously into letters with the following method. The alphabet, including long consonants, is stored in a table. The first letter of the morpheme is the longest letter of the table that matches the beginning of the morpheme. This letter is detached and the process is continued on the remaining part of the morpheme:

(6) =dzsessz=szín=ház → = dzs e ssz = sz í n = h á z 'jazz theatre'

### 4.2.3. Letter-to-phoneme conversion

Due to the close correspondence, the mapping of letters to phonemes can be considered unambiguous and can be done letter by letter. As a result we get a phoneme sequence; the canonical phonemic transcription of the input word extended with morpheme boundary symbols.

(7) (a) = t a x i → = t ɔ k s i 'taxi'

(b) = l y u k → = j u k 'hole'

In the next step, we will switch from phonology to the phonetic level. Therefore, the segmental units will be referred to as 'phones' or 'speech sounds' rather than 'phonemes'. Also, the brackets surrounding phonetic transcriptions will be omitted from now on.

### 4.2.4. Application of phonological rules

The pronunciation variants of the input word are generated with the appropriate application of Hungarian phonological rules. For treating the problems described in the previous section, we use the formalism below (after Wothke 1991), which permits the generation of alternative outputs for each rule and is able to utilise morpheme boundary information.

(8) X{Y}Z → ⟨W1|...|Wn⟩

This rule changes the extended phone string Y to the alternative phone strings W1,...,Wn if it occurs in the phonetic transcription of the input word with X as left and Z as right context. Both X and Z are (extended) phone string sets as permitted string elements. (The use of phone sets is described later in this section.)

Examples of the simple use of this formalism:

(9) (a) Rules (merger of consonants)

1. {t = j} → ⟨t j⟩
2. {t % j} → ⟨cː⟩
3. {t + ʃ} → ⟨t ʃ | ʧː⟩

(b) Application:

| | | | |
|---|---|---|---|
| 1. = aː t = j aː r oː | → | = aː t j aː r oː | 'passage' |
| 2. = l aː t % j ɔ | → | = l aː cː ɔ | 'can see it' |
| 3. = ɔ p aː t + ʃ aː g | → | = ɔ p aː ⟨t ʃ \| ʧː⟩ aː g | 'abbey' |

There are two types of rules in terms of direction of application: 'forward rules' and 'backward rules'. In the case of forward rules, the best matching rule is searched from the beginning of the extended input phone string and applied if it exists. The search then continues with the next phoneme until the word ends. In the case of backward rules, the evaluation sequence is the opposite. Backward rules provide a convenient way to formulate rules of assimilation:

(10) (a) Pronunciation rules (backward rules):
VOICING = {b d ɟ g z ʒ d͡z ʤ}
// comment: consonants that can change
// the preceding consonant from voiceless to voiced
{ t } VOICING → d
{ t = } VOICING → d
{ ʃ } VOICING → ʒ
...

(b) Application:
=ɛzyʃt=baːɲɔ → =ɛzyʒdbaːɲɔ 'silver mine'

In this example, the variable "VOICING" defines a phone set. When it occurs in a rule, it matches any of the phones on the right hand side of its definition, in this example it matches [b], [d], [ɟ], ... Starting with the second rule, [t] is changed into [d]. In the next step, this [d] changes the preceding [s] into [ʒ], using the third rule.

The rules are structured into groups. The evaluation direction is the same within each group, so that a group of rules is evaluated at one time as described. The phonotypical phonetic transcription of the input word, including the pronunciation alternatives, is generated by the sequential application of rule groups.

The rule groups may have illustrative linguistic meanings. With the organisation of groups illustrated in Figure 2, words that are subject to more than one pronunciation rule can also be transcribed.

The shortening/lengthening/insertion/dropping of vowels and consonants can hardly be algorithmically described, therefore they are handled as exception-like rules. (Examples: *szőlő* → [s ø lː øː] 'grapes', *lesz* → [l ɛ sː] 'will be', *juh* → [j u] 'sheep', etc.)

Actually, in Figure 2—excluding the dashed line block—the pronunciation is modelled at the phonological level. Of course, the scope of this pronunciation modelling is limited, but many "problematic" words can be transcribed in this way as it is shown in the right side of the figure (the morpheme boundary symbols are not shown).

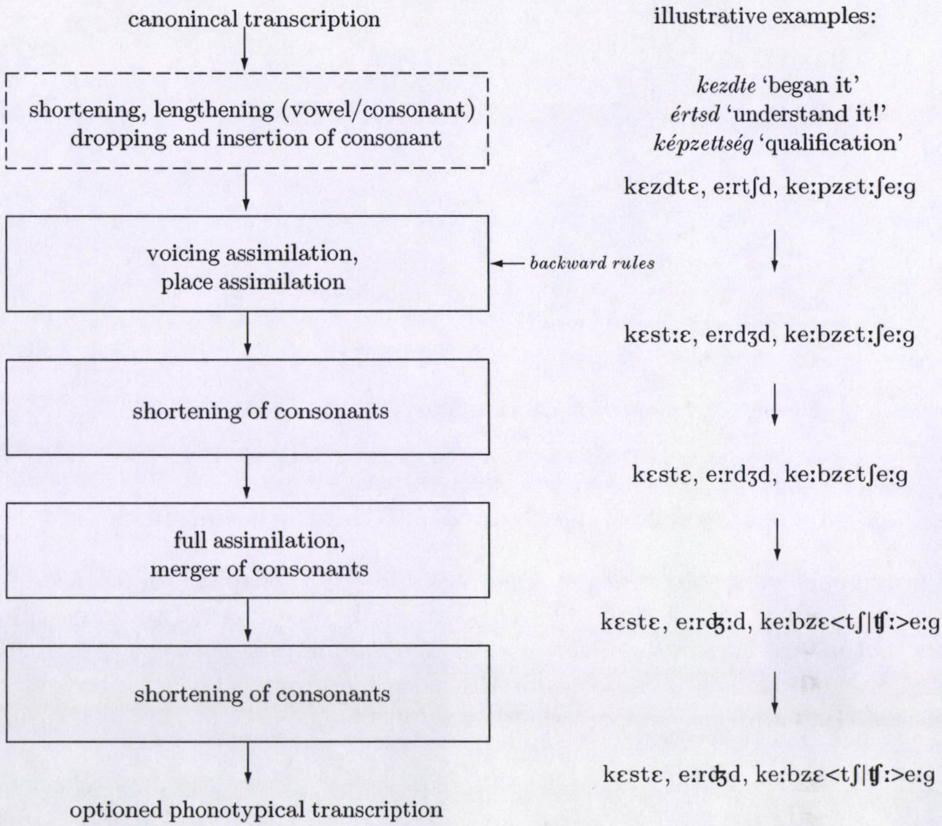


*Fig. 2*
The generation of phonotypical transcription including alternatives by means of formalised pronunciation rules

### 4.2.5. Text-to-graph conversion

Finally, the phonotypical transcription containing the pronunciation options—which we call optioned phonetic transcription—is converted to graph representation. The result is a pronunciation phone-network, which can be effectively stored and used in the computer. Of course, this last step is not a subtask of the phonetic transcription, it is a wholly separate procedure but, as it nearly always follows the transcription process, we included it in the description here.

(11) ɔzo⟨nm|mː⟩oːd → 0 1 ɔ;
1 2 z;
2 3 o;
3 4 n;
4 5 m;
3 5 mː;
5 6 oː;
6 7 d;

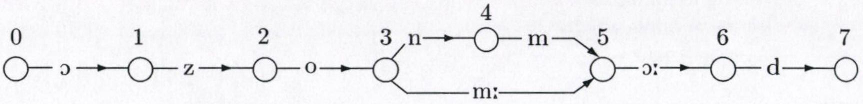


*Fig. 3*
The pronunciation graph representation of the Hungarian word *azonmód* [ɔzonmoːd] or [ɔzomːoːd] 'right away'

## 4.3. The extension of the algorithm for (training) sentences

The previously presented method generates the optioned phonetic transcription of an input word. The question is: How can it be enhanced to transcribe whole sentences? Fortunately, the answer is quite simple: only the introduction of word boundary symbols and the corresponding rules are necessary, otherwise the entire process described is applicable.

(12) (a) An example rule:
{t \\ = s} → ⟨t□s|ts|tsː⟩
//comment: symbol '\' denotes the beginning and ending of a word

(b) Application: *Mit szólsz*? 'What do you say?'
\ = mi%t \\ = soːl%s \ → \ = mi%⟨t□s|ts|tsː⟩oːl%s \

Due to optional pauses between words and possible consonant clusters across word boundaries, it is not a straightforward job to construct a compact set of rules for sentences. But our aim is to produce correct (optioned) phonetic transcriptions for the large majority of sentences; the elaboration of a perfectly precise technology would be unrealistic.

Besides, as the training algorithms are statistical, they are relatively insensitive to transcription or other errors. The only important thing is that there should be many more correct forms than erroneous ones. But if this is true, do we really need the optioned transcriptions? Would it not be enough to use some simple linear phone sequences for training? To answer these questions we carried out some experiments, which will be described in the following section.

## 5. Experimental results on isolated-word recognition tasks

Two types of experiments have been conducted. In the first one, the **vocabulary representation** of the words to be recognised was investigated; the linear transcription was compared to the optioned one in a particular recognition problem. In the second type of experiment—which has been done very recently—the scope of our investigation was the **training method**, the recognition environment was the same in every experiment. Three different kinds of phonetic transcription were used for training, and the recognition efficiencies of the resulting three different acoustic models were compared to each other in a series of experiments.

### 5.1. Number recognition tests with different vocabulary representations

In this set of experiments, the BABEL high quality speech database was used (Vicsi–Vig 1998). It consists of three different parts: compound number utterances (like *kettő* 'two', *négyszázötvenhat* 'four hundred and fifty-six', *ezerhúsz* 'one thousand and twenty', etc.), CVC syllables, and continuously read paragraph-sized speech samples. The number of speakers available is 20 (10 men and 10 women), and there are altogether about 900 sentences and 9700 numbers in the database. The voice of 14 speakers composed the training set, and the rest of the compound number data were used in the recognition tests. In the experiments the numbers and the paragraphs were used separately for training, resulting in two different acoustic model sets.

Because only a small fraction of the database was segmented at phone level, the model training was carried out in two steps. In the first step initial models were trained using a K-means algorithm and Viterbi-training on the manually segmented data. Then the rest of the database was segmented automatically by forced alignment with the FlexiScribe tool (Szarvas et al. 2000). For forced alignment the traditional "linear" phonetic transcriptions provided by the developers of the database were used. In the second step the entire training material was used for training with the labels generated previously.

During the isolated number recognition tests, all 140 numbers occurring in the test database were listed in the vocabulary. The numbers were transcribed to phoneme sequences automatically. In the experiment the effect of the presence or the absence of pronunciation alternatives was investigated (Table 1). In the first case the canonical pronunciation was used while in the second case all alternatives were listed in the vocabulary.

*Table 1*

Isolated number recognition error rates using two different pronunciation models. Acoustic models were trained by numbers (a) and by general speech (b)

(a)

| Vocabulary representation | Error rate | Relative improvement |
|---|---|---|
| Canonical pronunciation | 0.48% | 6.3% |
| Pronunciation alternatives | 0.45% | |

(b)

| Vocabulary representation | Error rate | Relative improvement |
|---|---|---|
| Canonical pronunciation | 2.69% | 4.1% |
| Pronunciation alternatives | 2.58% | |

The error rates decreased slightly for both acoustic model sets, but the improvements cannot be considered significant due to the very small difference in the absolute error rates.

### 5.2. City name recognition tests using different phonetic transcriptions for training

These experiments were made to evaluate the efficiency of our method developed for the transcription of training sentences. Three differently made phonetic transcriptions were compared to each other, the basis of comparison were the recognition error rates of the three differently taught recognisers on the same recognition task.

MTBA, the first public Hungarian telephony speech database was used for training (Vicsi 2002). At the time of experimentation the first 100 speakers' data was segmented manually (phonetically rich words and sentences), so we utilized this part of the material. From the database we were able to exploit the following components (beyond the waveform files): the annotated source text of the read sentences, their automatically made linear phonetic transcriptions, and the manually made phone-level segmentation of the sentences. Based on these facts, we made a comparative analysis of phonetic transcription methods in the following way:

- First we split the speech data of the 100 speakers into two parts. The acoustic models used later for forced alignment were trained on the first 50 speakers' data utilising manual segmentation, and only the other 50 speakers' data was used for the rest of the experiments.
- Three different phonetic transcriptions were collected for each sentence. The first was the above-mentioned, automatically made one. The second

was the manual one; we got these from the manual segmentations by simply leaving the time boundaries out. The third one was the optioned phonetic transcription which was generated by our transcription method from the annotated source text. (The morpheme analysis step was not implemented yet in the algorithm.)

- Forced alignment was performed with all three transcriptions for all sentences. As a result we got three segmentations for all training utterances.

- Initiated by these three segmentations, three training procedures were performed in the same way using the Cambridge Hidden Markov-Model Tool Kit (HTK) functions (Young et al. 2000). All training consisted of 26 iterations. The first step was the K-means and Viterbi training (Hinit) with 1 Gauss function per phone-model, and it was followed by the embedded Baum–Welch re-estimations (HERest) with mixture increments. (Mixture: the number of Gauss functions at a phone-model)

- After each training iteration a Hungarian city name recognition was carried out on an independent telephony speech database with a vocabulary size of 480. All utterances came from different speakers. The recognition rates are shown in Figure 4 (overleaf).

In order to check our—somewhat surprising—results, we repeated the whole series of experiments by swapping the first and second half of the hundred speakers available (Figure 5, overleaf).

It can be seen that our automatically made optioned phonetic method outperformed not only the traditional automatic but the manual method as well. It is important to sharply distinguish the original manual segmentation from the segmentation provided by a forced alignment using manually transcribed data; our comparison is valid for the latter case.

## 6. Conclusions

In this article we summarised our work and experiences with Hungarian phonetic transcription in automatic speech recognition. We also gave a short introduction on speech recognition principles for people not familiar with this scientific field.

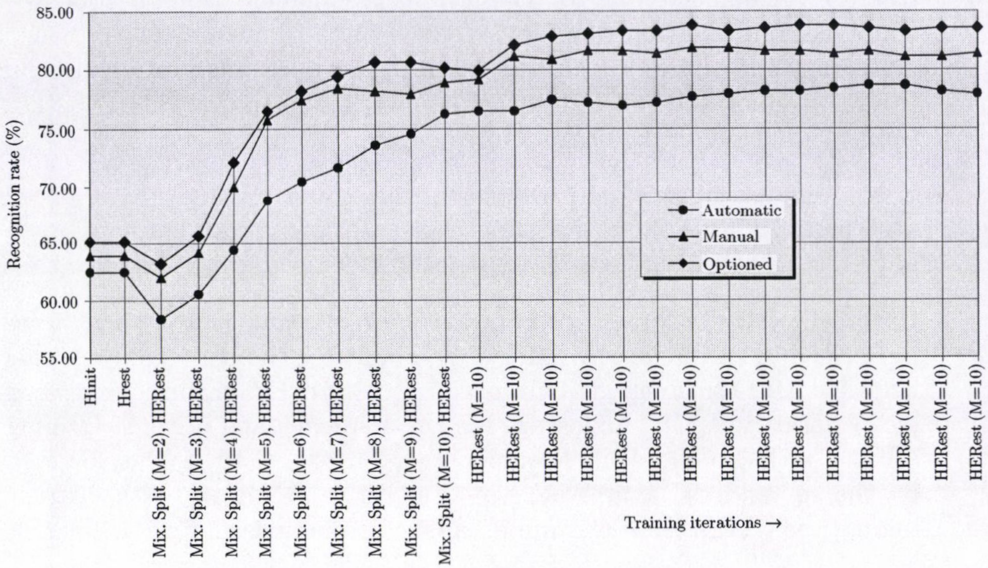


*Fig. 4*

City name recognition error rates referring to the acoustic models of speakers 50–99, trained using different phonetic transcriptions

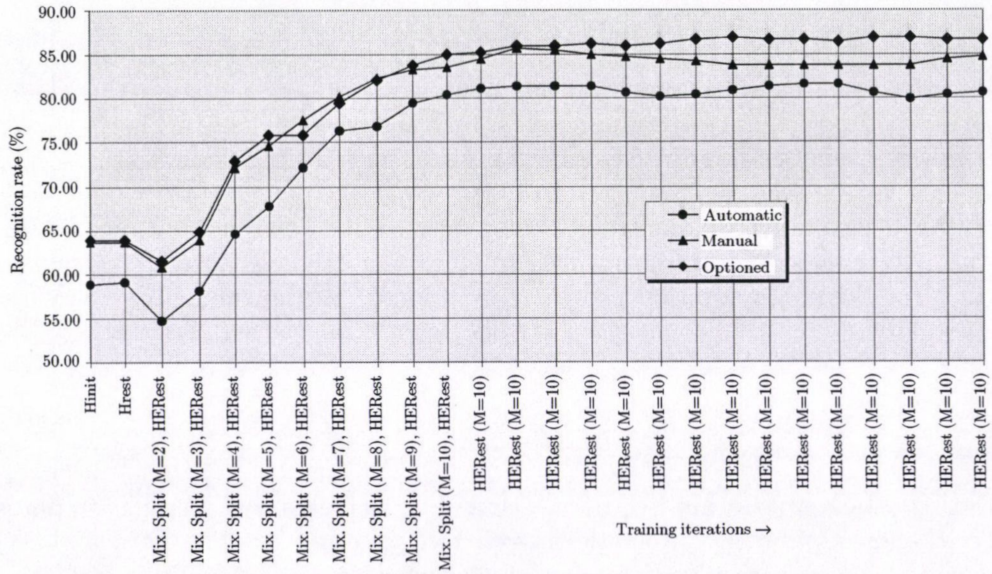


*Fig. 5*

City name recognition error rates referring to the acoustic models of speakers 0–49, trained using different phonetic transcriptions

We have developed a method for transcribing Hungarian texts automatically, which is an extension of the traditional linear transcription approach. Its output is called 'optioned' because it contains pronunciation options in parallel arcs. We presented our experiences with promising improvements in training efficiency. The achievements were due to the application of deeper linguistic (phonological) knowledge. Moreover, with the training technique developed not only the quality of the acoustic models can be enhanced, but also, at the same time, the amount of the required manual work can effectively be decreased because of the automatic method.

This paper does not deal with connected-word or continuous recognition, which are discussed in another paper (Szarvas–Furui to appear).

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# *H* AS IN HUNGARIAN

PÉTER SIPTÁR – SZILÁRD SZENTGYÖRGYI

## Abstract

The paper discusses the possible analyses of the behaviour of [h] and [x] in Hungarian. It argues that in a derivational, rule-based framework two types of analyses are possible: one that assumes two separate underlying segments, /x/ and /h/, and thus misses the generalisation that the two segments are in complementary distribution, a typical characteristic of allophones. The second kind of approach argues that [h] and [x] come from the same underlying segment; this type of analysis can be further divided into two subtypes. According to one of these, the underlying segment is /h/. To be able to derive the attested output forms, three separate strengthening rules must be posited, an obvious disadvantage. The other possible approach, on the other hand, argues that the underlying segment is always /x/ weakened into a [h] in onsets and deleted in a group of lexically marked words by a minor rule. Besides, we also consider the behaviour of *H*-type segments in voice assimilation: they trigger but do not undergo that process. Siptár and Törkenczy (2000) suggest that if a filter disallowing surface voiced dorsal fricatives, i.e., *ɣ, is proposed, then the desired result is obtained.

While such a filter is an ad hoc device in rule-based theories, it is an organic part of a solution in Optimality Theory (OT), which argues that both /h/ and /x/ may occur in the input and the constraint hierarchy must be such that they should always select well-formed output candidates as optimal regardless of the input. As a result of this and Lexicon Optimization (LO), non-alternating forms will have /h/ or /x/ in their underlying representation depending on the output forms while alternating forms may have an underlying /x/ or /h/ as a result of the alternation sensitive LO (Inkelas 1994). Finally, we will show that the treatment of the behaviour of /x/ or /h/ in voice assimilation is simple in OT if we assume the constraint proposed by Siptár and Törkenczy (2000), prohibiting voiced dorsal fricatives, *ɣ, which, interacting with the ones suggested by Petrova et al. (2001), will be able to select the actual surface form as optimal in all cases.

## 1. Introduction

The paper is concerned with the description of the behaviour of *H*-type segments in two types of framework: it starts with a proposal within a rule-based derivational theory and ends with a non-derivational account given in Optimality Theory (OT).

Optimality Theory as first described in Prince–Smolensky (1993) is an input-output device without serial derivation or intermediate levels. The OT

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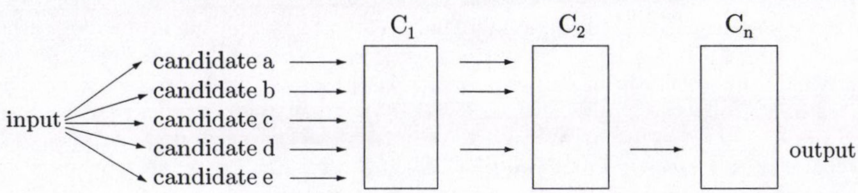
model of grammar consists of three major components: the Lexicon, which contains the underlying representations of all the words and morphemes of the language; the Generator function (Gen), which maps each input form onto an infinite number of output candidates; and the Evaluation function (Eval) mapping this infinite set of possible candidates onto one candidate, the optimal one, which is the output form corresponding to the input. Eval is made up of a set of ranked constraints and it is these constraints that constitute Universal Grammar (UG) in the sense that all languages or language varieties have exactly the same constraints. It is the relative priority or ranking of the constraints that distinguishes one language from another. The constraints can be violated by the output candidates, but these violations are not necessarily fatal as we shall see. It is important to note that evaluation is parallel, no serialism is involved.

(1) OT AS AN INPUT-OUTPUT DEVICE




In (1), Gen generates an infinite candidate set from the input, five of which are shown. $C_1$, $C_2$ and $C_n$ are the constraints of Eval and they map the infinite set onto a one-member set, the optimal candidate, which is the output form.

Since we are making use of the Correspondence Theory of Faithfulness (McCarthy–Prince 1995), we also have to mention a mapping between input and output forms, which sets up a correspondence relation between segments/units of the input and those of the output by a simple indexation. Input and output segments correspond to each other if they have the same index.

Constraints can be of two major kinds: markedness constraints requiring that output forms are only made up of unmarked units (e.g., "all front vowels must be unrounded" = no front rounded vowels), and faithfulness constraints, which penalize changes to the input form (e.g., "all input segments must have an output correspondent" = no deletion). The evaluation of output candidates by the constraint hierarchy can be illustrated by tableaux, which show the output candidates in the first column followed by the constraints, left-to-right, starting with the dominant, highest ranked ones. Asterisks indicate violations of the constraint by the candidate and exclamation marks show which violation is fatal, while the cells containing the violations that are not relevant because they are lower than all the fatal violations are shaded for easier understanding. The rightward pointing hand shows the optimal candidate.

(2)

| | $C_1$ | $C_2$ |
|---|---|---|
| ☞ candidate a | | * |
| candidate b | *! | |

If all the candidates satisfy or violate a high ranked constraint, then the decision is passed on to the next constraint in the hierarchy as illustrated by the schematic tableaux in (3) and (4).

(3)

| | $C_1$ | $C_2$ |
|---|---|---|
| ☞ candidate a | * | |
| candidate b | * | *! |

(4)

| | $C_1$ | $C_2$ |
|---|---|---|
| ☞ candidate a | | |
| candidate b | | *! |

Since according to one of the important properties of OT, the Richness of the Base, any kind of form is possible in the input, the constraint hierarchy has to be such that independent of the input form, the optimal output candidate should always conform to the requirements of the language. Because of this, it may happen that evaluating two different underlying forms results in phonetically identical optimal outputs. In such cases, it is Lexicon Optimization (LO) that decides which underlying form should be preferred by the language: it is always the one in the case of which the output candidate has fewer and less serious violations. This is shown in tableaux (5)–(6).

(5)

| Input 1 | $C_1$ | $C_2$ |
|---|---|---|
| ☞ candidate a | | |
| candidate b | *! | |

(6)

| Input 2 | $C_1$ | $C_2$ |
|---|---|---|
| ☞ candidate c | * | |
| candidate d | * | *! |

where *candidate a* is phonetically identical to *candidate c*

As we can see, from the two different input forms two winning candidates are selected, candidates (a) and (c), which are phonetically identical. Lexicon Optimization decides that the input form in (5) should be preferred as the underlying representation of the word because if we compare the two winning candidates, it can be seen that while candidate (c) does violate the higher ranked $C_1$, (a) does not violate either constraint and is thus "closer" to the input.[1]

The organisation of the paper is as follows: section **2** introduces the distribution of $H$-type segments and their possible representations. Section **3** discusses the three derivational analyses, one assuming that both /x/ and /h/ are underlying, another one proposing only /h/ as an underlying segment, and finally the one assuming only an underlying /x/. Section **4** draws the reader's attention to the problems of such derivational analyses while section **5** introduces the facts concerning the behaviour of $H$-type segments in voice assimilation. Section **6** shows how an analysis in OT is superior to the derivational ones discussed before and we give an account of the voice assimilation facts in the framework of OT in section **7** followed by the conclusion.

## 2. The distribution of *H*-type segments

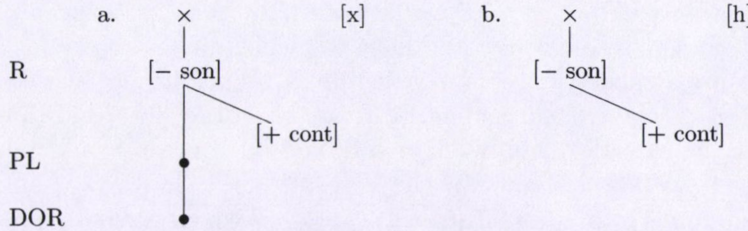
In present-day Hungarian speech, there are four different "$H$-type" segments: a voiceless glottal fricative [h] (as in *hó* 'snow'), a voiced glottal fricative [ɦ] (as in *ruha* 'dress'), a voiceless velar fricative [x] (as in *doh* 'musty smell'), as well as a slightly fronted variant of the latter (as in *pech* 'bad luck') that is often erroneously identified with palatal [ç]. The difference between [h] and [x] is phonologically relevant: the distribution and phonological analysis of those two segments is the subject matter of the present paper. Voiced [ɦ] is merely a phonetic (coarticulatory) variant of glottal [h] occurring in a post-sonorant (including intervocalic) position; the fronted velar fricative as in *pech*, on the other hand, is related to the [x] of *doh* in the same manner as e.g., the fronted [k] of *fék* 'brake' to the non-fronted [k] of *fok* 'degree'. That is, the small phonetic difference between them is phonologically irrelevant. In what follows, the difference between [h] and [ɦ], as well as that between velar [x] and its fronted variant, will be disregarded.

In this paper, then, we will discuss [h] as in *hó* and [x] as in *doh*. (Capital $H$ will be used to refer to the two segment types together until we decide whether they are variants of the same underlying segment or else two distinct members of the consonant inventory of Hungarian.) Their phonological rep-

[1] For further general introduction to OT, cf. Archangeli – Langendoen (1997); Kager 1999; Roca – Johnson (1999, ch. 19); McCarthy (2002).

resentations are as follows[2] (R = root node, PL = place node, DOR = dorsal node; the lack of place specification in the case of [h] is meant to suggest that it is articulated outside the oral cavity, in the glottis):

(7) REPRESENTATIONS OF THE TWO TYPES OF *H*




In coda position, *H* is either deleted (e.g., *méh* [meː] 'bee', *cseh* [ʧɛ] 'Czech'), or else it occurs in the form shown in (7a) (e.g., *jacht* 'yacht', *technika* 'engineering', *ihlet* 'inspiration', *Ahmed*; *doh* 'musty smell', *potroh* 'abdomen', *sah* 'Shah', *Allah*, *padisah* 'Padishah', *sarlach* 'scarlet fever', *almanach* 'yearbook', *moloch* 'Moloch', *eunuch* 'id.', etc.) Geminate *H* is always like (7a), i.e., a velar fricative, irrespective of whether it occurs in a branching coda (*pech* 'bad luck', *cech* 'bill', *Bach*, *krach* 'crash', *fach* 'pigeon-hole') or is divided between a coda and a subsequent onset (*peches* 'unlucky', *Bachot* 'Bach' (acc.)). Elsewhere, an *H* occurring in an onset is always (7b), a glottal fricative (*hó* 'snow', *ruha* 'dress', *konyha* 'kitchen'). How should we account for these facts?

## 3. A derivational analysis of the distribution facts

Let us start with the alternation of the type [ʧɛ] ~ [ʧɛhɛk] 'Czech' (sg.) ~ (pl.). As in any ∅ ~ X alternation (that is, in all cases where something alternates with nothing, the lack of itself), two basic types of accounts suggest themselves: deletion (syncope) and insertion (epenthesis). In the latter case we could say that *cseh* and *doh* behave in two different ways because the lexical representation of *doh* includes an *H*, whereas that of *cseh* does not. In *cseh*-type words, then, there would be a rule of *H*-insertion that would apply before vowel initial suffixes. Given that the syllabic position at hand is an onset, this rule would obviously insert a [h], that is, a segment of the type (7b), as in *csehül* 'in Czech', *csehek* 'Czechs'. However, this solution has two

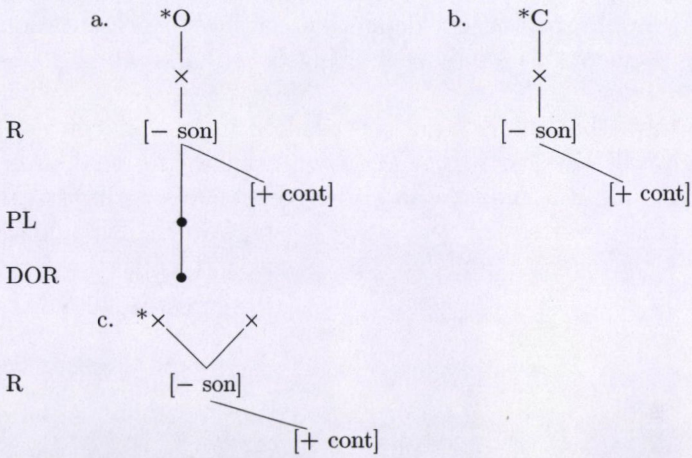
[2] See Siptár – Törkenczy (2000, 7–9), with respect to the feature geometry assumed in this paper.

serious drawbacks. First, the overwhelming majority of vowel final words do not exhibit such insertion: **kávéhok* (cf. *kávé-k* 'coffee' (pl.)), **kapuhok* (cf. *kapu-k* 'gate' (pl.)). This problem could be solved by taking $H$-insertion to be a **minor rule**: one that only applies to words specifically marked in the lexicon to that effect (i.e., the entry of *cseh* would include the instruction 'apply $H$-insertion', whereas that of *kávé* would not). But there is an even more serious difficulty that this solution would have to face. Suffixes consisting of a single consonant are attached to regular vowel final stems with no intervening 'linking vowel' (*kávé-t* (acc.), *kávé-k* (pl.)). In other words, the condition on $H$-insertion that the insertion site must be followed by a vowel would not be met in these cases. What is more, in the case of "*cse*", low vowel lengthening would also come into the picture (cf. Siptár–Törkenczy 2000, 170–3). That is, the expected forms would be **csét*, **csék* (as in *kefét* 'brush' (acc.), *kefék* 'brush' (pl.)). Thus, *cseh*-type words, were they to end in a vowel in their lexical representation, would **exceptionally** be exempted from low vowel lengthening, would **exceptionally** require a linking vowel before suffixes consisting of a single consonant, and would **exceptionally** insert a [h] before that linking vowel. These three sorts of exceptionality are the easiest to record in the lexicon in the form of assuming that the lexical item ends in an $H$. That is, the insertion account is untenable.

In the deletion case, on the other hand, we would have to be able to tell why some words require deletion (*cseh*), whereas others do not (*doh*). According to the traditional view, deletion is the regular event for $H$-final words, and all items in which it does not apply are exceptions (or, worse still, "not proper Hungarian words"). But, first of all, a lot more words behave like *doh* than like *cseh*, and whenever a new word is introduced (either by borrowing or, e.g., as an acronym like *MÉH* 'name of a company for collecting waste material', *APEH* 'name of the tax office', and *BAH* 'name of an intersection in Budapest'), it invariably joins the *doh* group, not the *cseh* group. The pattern exemplified by *doh* is the productive one. Secondly, there is a significant amount of vacillation in the *cseh* group: *juh* 'sheep', *pléh* 'tin', *céh* 'guild', *düh* 'anger', *rüh* 'scabies', *oláh* 'Wallachian', *éh* 'hunger', *keh* 'wheeziness', *tereh* 'burden' are all traditionally of the *cseh* type but all of them exhibit extensive variability and, for most of them, *doh*-type behaviour, that is, the lack of $H$-deletion seems to gain the upper hand. Thus, we are forced to draw the conclusion that $H$-deletion is a minor rule: words that undergo it are exceptional, not words that do not. The exact way of formulating this rule of $H$-deletion will be decided on when we have accounted for the distribution of the two kinds of $H$.

This can be done in three different ways in principle. First, we could assume (with Ritter 2000, 28–9) that we have to do with two distinct underlying segments here. Their distribution would then be accounted for by way of filters of the following form (O = onset, C = coda, × = timing slot):

(8) DISTRIBUTION OF THE TWO TYPES OF *H*




*(No* [x] *in an onset (except if it is also dominated by a coda node, i.e., it is long); no* [h] *in a coda; long H cannot be glottal, whether it occurs in a branching coda or in a coda + onset position.)*

The bonus in this solution would be that we would get deletion for free in the *cseh* type: all we would have to assume is that the words belonging here (exceptionally) include a glottal [h] in the lexicon that can only surface in case it gets into onset position by suffixation (*csehek* 'Czech' (pl.)). Otherwise (e.g., *cseh*, *csehben* 'in (a) Czech', *Csehország* 'Czech Republic', *cseh ellenzék* 'Czech opposition')—given that it cannot be parsed as a coda in view of (8b)—it could not be syllabified at all and as a stray segment it would have no audible effect on phonetic implementation (would fail to be pronounced).

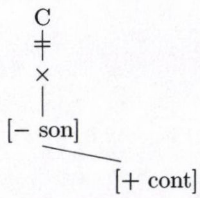
However, this solution would also have serious drawbacks in a derivational framework. First, discounting the handful set of *cseh*-type words, the two kinds of *H* are in complementary distribution: in contexts where one of them occurs, the other one never does, and *vice versa*. This means that it is impossible to find a pair of words such that the only difference between them is that one has (7a) whereas the other has (7b) in the same position. That is, the distribution of the two types of *H* is predictable and as such it is not to be recorded in the lexicon but rather to be formulated as a phonological rule. Furthermore, there is also alternation between the two types of *H* (e.g., *doh*

[x] ~ *dohos* [h] 'musty'). Hence, a rule that turns one into the other is required as part of the grammar anyway, a fact that makes the solution involving two distinct lexical (underlying) representations totally superfluous (again, if we think in terms of a derivational account).

The second and third solutions have one thing in common: they assume a single $H$ in the lexicon. In other words, they claim that the two different $H$'s appearing in pronunciation are context-dependent surface representations of the same underlying segment. The only remaining question is which to derive from which.

Let us assume, first, that all $H$'s are represented in the lexicon as (7b), i.e., the placeless (glottal) version: /h/. Then we need a rule that inserts a place specification into all $H$'s that are in coda position (as well as a minor rule of /h/-deletion that removes the /h/ of a *cseh*-type word if it finds itself in coda position; the latter rule will have to precede (bleed) the former). These two rules would look like this (see (9) and (10), respectively):

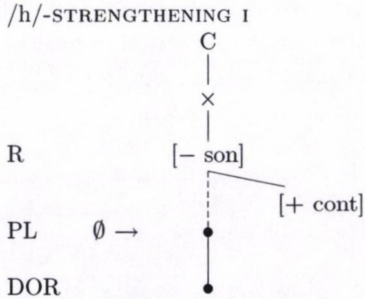
(9) /h/-DELETION




*(A placeless continuous obstruent (= a [h])—in words that are specified in the lexicon so as to undergo this rule—is delinked together with its timing unit, if it is in coda position.)*

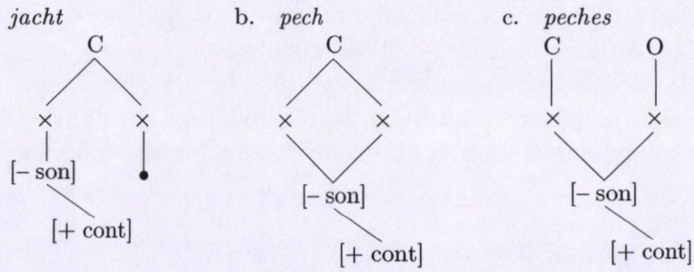
The deletion rule has to remove the ×, too, because /h/-deletion never involves compensatory lengthening (e.g., *csehnek* 'for a Czech' is pronounced [ʧɛnɛk], not [ʧɛːnɛk]; the latter can be a pronunciation of *cselnek* 'for a trick' with *l*-deletion, but it is not a possible rendering of *csehnek*).

(10) /h/-STRENGTHENING I

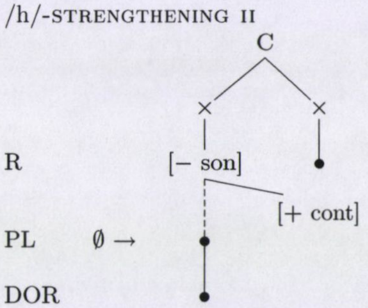



*(Insert a place node dominating DOR into a /h/ in coda position.)*

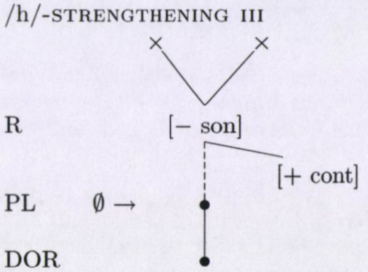
But this is not the whole story. A rule like (10) will insert a place node dominating DOR into e.g., *doh* 'musty smell', *potroh* 'abdomen', *almanach* 'id.', as well as *ihlet* 'inspiration', *technika* 'technique', but say nothing about *jacht* 'yacht' that has a branching coda, or words like *pech* 'bad luck', *krach* 'crash', in which both branches of the coda are filled by /h/, or about *peches* 'unlucky', *krachok* 'crash' (pl.), whose long /h:/ is divided between a coda and a subsequent onset. These three configurations are presented in (11):

(11)



It can be seen clearly that rule (10) does not fit any of the configurations in (11). Hence we need an additional rule of the form in (12) to tackle the situation in (11a), and one of the form in (13) to apply in cases like (11b–c).

(12) /h/-STRENGTHENING II



*(Insert a place node dominating DOR into a /h/ in the first position of a branching coda.)*

(13) /h/-STRENGTHENING III


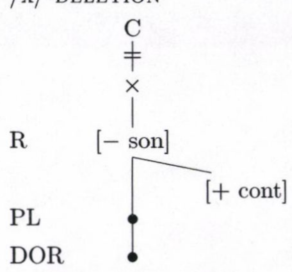

*(Insert a place node dominating DOR into a long /h:/.)*

The advantage of this solution is that phonological segments that have several surface realizations are usually represented in the lexicon by their word initial versions (or more generally, by their versions appearing in onsets) and it is those versions that serve as input to the derivation of their syllable final (coda) realizations. For instance, the lexical shape of /j/ is the sonorant [j] as in *jó* 'good'—and this is what the voiced obstruent [ʝ] as in *dobj* 'throw' (imp.) and the voiceless obstruent [ç] as in *lopj* 'steal' (imp.) are derived from (cf. Siptár–Törkenczy 2000, 205–6). However, this is not always the case: for instance, the onset and coda versions of /v/ are both derived from a third, neutral version (cf. Siptár–Törkenczy 2000, 198–205).

The most important drawbacks of the solution in (9)–(13) are as follows. First, it is rather complicated: in addition to the deletion rule, three different strengthening rules are required by it. Second, strengthening in coda position is cross-linguistically marked, or "unnatural": that position is usually a lenition site. And third, this solution is also arbitrary: why is it just a dorsal place specification that is inserted (i.e., why is /h/ strengthened into a velar—rather than, say, dental—fricative)? And where does that DOR come from?[3]

The third solution avoids all three of the above pitfalls. It says that all *H*'s are lexically represented as (7a), i.e., /x/. That underlying /x/ then loses its place specification in an onset, cf. rule (15),[4] whereas in coda position nothing happens to it (except in the exceptional *cseh* set where it is deleted in full,[5] with its timing slot and all):

(14) /x/-DELETION



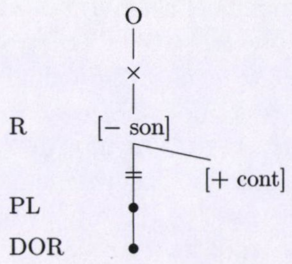

*(A dorsal continuous obstruent (= a [x])—in words that are specified in the lexicon so as to undergo this rule—is delinked together with its timing unit, if it is in coda position.)*

[3] If all relevant examples involved a back vowel (like *doh*), we could claim that the source of the spreading of DOR is that back vowel. However, in cases like *ihlet* 'inspiration', *pech* 'bad luck' etc. (where the adjacent vowel has COR) the DOR node has to come literally from nowhere.

[4] This is a typical lenition process occurring, in at least some of the cases, in a typical lenition site: intervocalically (cf. Harris 1990; 1997). However, it also occurs in **initial onsets** where lenition typically does not take place. This is just as problematic as the strengthening in the coda in the alternative analysis.

[5] Alternatively, we could also claim that *cseh*-type morphemes have two underlying allomorphs, a consonant-final and a vowel-final one, whose selection is morphological. This solution is suggested in Siptár – Törkenczy (2000, 276).

(15) /x/-WEAKENING




*(Delink the place node dominating DOR from a /x/ occurring—exclusively—in onset position.[6])*

In sum, all Hungarian consonants articulated behind the palatal area, i.e., not only /k/ and /g/ but also *H* (that is, /x/) are velar (contain DOR as a place specification). This place specification is delinked (and lost) in an onset, whereby glottal [h] is produced: *ha* 'if', *nátha* 'flu'; *ruha* 'dress', *konyha* 'kitchen'; *csehek* 'Czech' (pl.). In all other cases, the underlying representation surfaces (*doh* 'musty smell', *technika* 'technology', *peches* 'unlucky'), except in a few words (*cseh* 'Czech', *méh* 'bee'), where the whole /x/ is deleted in order to avoid ending up in coda position.

## 4. Problems with the derivational analysis

We may distinguish two types of problems concerning the derivational analyses of the behaviour of *H*-type segments. The first kind of problem is general theoretical while the second kind is particular to the aforementioned derivational solutions.

As far as general theoretical problems are concerned, we can refer to the issues that have led to the emergence of non-derivational theories. Among these we find the question whether a derivational type of grammar purely consists of a series of rules or rather rules and constraints. Since the Obligatory Contour Principle (OCP), as well as other morpheme well-formedness conditions, was suggested as a constraint not to be violated, we can claim that such a grammar cannot only be made up of rules. If, however, there are both rules and constraints, how are their possible interactions limited?

[6] The non-application of (15) to a geminate /x:/ (i.e., to the configuration (11c)) is an instance of geminate inalterability (cf. Siptár – Törkenczy (2000, 276–7) and references cited there). As the rule explicitly refers to the timing tier, it is to be interpreted exhaustively, i.e., it does not apply to an input in which the segmental content is multiply linked to two timing slots and is in coda and onset position at the same time.

Such a theory would definitely be too powerful, it would result in predicting a number of possible but unattested grammars. Optimality Theory (OT) offers a different alternative: it suggests that grammar only consists of constraints and that these constraints are ranked with respect to each other; thus the question of the interaction between rules and constraints does not even arise.

The other important theoretical type of problem is that of intermediate representations: since there are several rules in a grammar, ordering them in the appropriate manner may give us whatever we want, i.e., the possibility to order rules extrinsically is too powerful a device, too, in itself. Since OT is an input-output device, that is one without intermediate representations, this problem may be avoided as well.

Also, conspiracies are very difficult to explain in a rule-based theory, where the structural description, i.e., what triggers the rule, and the structural change, i.e., what happens or how the undesirable situation is amended, are contained within the same rule. On the other hand, OT captures this kind of functional unity of the rules in a simple but elegant way: the trigger constraint only states the undesirable configuration but it is the other constraints and their relative ranking that selects what the best, or rather optimal, solution is.[7]

As far as the particular problems with the above derivational solutions are concerned, some of them have already been mentioned: if we stipulate both underlying segments, /x/ and /h/, then the generalisation that the surface [x] and [h] are allophones is missed. On the other hand, if we assume that in every instance of a surface *H*-type segment there is an underlying /h/, then we need three different strengthening rules in three slightly different environments: in non-branching codas, in branching codas whose first segment is [x], and in codas containing a geminate [xː] or the first part of a geminate [xː]. The third analysis proposing an underlying /x/ also runs into problems. Namely, although such a solution is simpler than the previous two, it is counter-intuitive as the number of non-alternating stems containing a surface [h], e.g., *hegy* [hɛɟ] 'hill', is significantly higher than the number of alternating stems, i.e., those sometimes containing [x] and sometimes [h], e.g., *doh* ~ *dohos* [dox] ~ [dohoʃ] 'musty smell' ~ 'with a musty smell', and non-alternating stems containing a surface [x], e.g., *jacht* [jɒxt] 'yacht', taken together.

A further complication is the exceptional behaviour of *H*-type segments in voice assimilation. This is what we turn to in the next section.

[7] For a detailed comparison of rule-based and constraint-based grammars see Kager (1999); cf. also Roca (1997), Hermans – van Oostendorp (1999), and McMahon (2000).

## 5. The behaviour of [x] with respect to voice assimilation

In Hungarian, adjacent obstruents must agree in terms of voicing (cf. Ritter 2000 and references cited there).

Of word initial consonant clusters, those that do not contain a sonorant are always voiceless throughout as in (16a);[8] even irregular initial clusters conform to this pattern, see (16b):

(16) (a) sport [ʃp] 'sports', stég [ʃt] 'landing-stage', skála [ʃk] 'scale', szpáhi [sp] 'Turkish cavalryman', sztár [st] 'leading man/lady', sztyeppe [sc] 'prairie in Russia', szkíta [sk] 'Scythian'

(b) psziché [ps] 'psyche', xilofon [ks] 'xylophone', szfinx [sf] 'sphinx'

Other morpheme-internal (intervocalic or morpheme-final) obstruent clusters are either all-voiceless as in (17a,b) or else all-voiced as in (17c,d):

(17) (a) pitypang [cp] 'dandelion', puszpáng [sp] 'boxwood', ráspoly [ʃp] 'file'; szeptember [pt] 'September', bukta [kt] 'sweet roll', kaftán [ft] 'Turkish coat', asztal [st] 'table', este [ʃt] 'evening'; kesztyű [sc] 'glove', bástya [ʃc] 'bastion'; sapka [pk] 'cap', patkó [tk] 'horseshoe', butykos [ck] 'pitcher', dafke [fk] 'obstinacy', deszka [sk] 'plank', táska [ʃk] 'bag', kocka [ʦk] 'cube', bocskor [ʧk] 'moccasin'; klopfol [pf] 'beat (steak)', bukfenc [kf] 'somersault', aszfalt [sf] 'asphalt', násfa [ʃf] 'lavalier'; kapszula [ps] 'capsule', buksza [ks] 'purse'; tepsi [pʃ] 'frying-pan', taksál [kʃ] 'estimate'; nátha [th] 'cold (n)'; kapca [pʦ] 'foot clout', vakcina [kʦ] 'vaccine'; kapcsol [pʧ] 'link (v)'

(b) kopt [pt] 'Coptic', akt [kt] 'nude', szaft [ft] 'gravy', liszt [st] 'flour', test [ʃt] 'body', jacht [xt] 'yacht'; maszk [sk] 'mask', barack [ʦk] 'apricot'; copf [pf] 'plaited hair'; gipsz [ps] 'gypsum', koksz [ks] 'coke'; taps [pʃ] 'applause', voks [kʃ] 'vote (n)'; also in placenames like Apc, Detk, Batyk, Recsk, Szakcs, Paks, etc.

(c) rögbi [gb] 'rugby football', azbeszt [zb] 'asbestos'; labda [bd] 'ball', Magda [gd] ⟨a name⟩, bovden [vd] 'Bowden cable', gazdag [zd] 'rich', rozsda [ʒd] 'rust'; mezsgye [ʒɟ] 'ridge'; izgul [zg] 'be excited', pezsgő [ʒg] 'champagne'; udvar [dv] 'yard', fegyver [ɟv] 'weapon', özvegy [zv] 'widow'; kobzos [bz] 'minstrel', madzag [dz] 'string', lagzi [gz] 'wedding'; habzsol [bʒ] 'devour'

(d) smaragd [gd] 'emerald', kezd [zd] 'begin', pünkösd [ʒd] 'Whitsun', kedv [dv] 'temper', edz [dz] 'train (v)'

Loanwords that originally contained an obstruent cluster of heterogeneous voicing (or happen to have a spelling suggesting one) automatically get adjusted to this pattern:

[8] In this paper, we abstract away from the behaviour of /v/; see Szentgyörgyi (2000); Ritter (2000); Siptár – Törkenczy (2000, 298–305).

(18) (a) abszolút [ps] 'absolute', obstruens [pʃ] 'obstruent', abcúg [pts] 'down with him!', abház [ph] 'Abkhaz', Buddha [th], joghurt [kh] 'yogurt'

(b) futball [db] 'football', Macbeth [gb], matchbox [ʤb] 'toy car', Updike [bd], anekdota [gd] 'anecdote', afgán [vg] 'Afghan'

In suffixed forms, stem-final voiceless obstruents become voiced if the suffix begins with a voiced obstruent (19a) and vice versa: stem-final voiced obstruents become voiceless if the suffix begins with a voiceless obstruent (19b):

(19) (a) kalap-ban [bː] 'in (a) hat', kút-ban [db] 'in (a) well', fütty-ben [ɟb] 'in (a) whistle', zsák-ban [gb] 'in (a) sack', széf-ben [vb] 'in (a) safe', rész-ben [zb] 'in part', lakás-ban [ʒb] 'in (a) flat', ketrec-ben [dzb] 'in (a) cage', Bécs-ben [ʤb] 'in Vienna'

(b) rab-tól [pt] 'from (a) prisoner', kád-tól [tː] 'from (a) bath-tub', ágy-tól [ct] 'from (a) bed', meleg-től [kt] 'from the heat', szív-től [ft] 'from (a) heart', víz-től [st] 'from water', garázs-tól [ʃt] 'from (a) garage', bridzs-től [ʧt] 'from bridge (the card game)'

This assimilation process is regressive and (right-to-left) iterative:

(20) liszt-ből [stb] → [sdb] → [zdb] 'from flour'
pünkösd-től [ʒdt] → [ʒtt] → [ʃtt] (→ [ʃt]) 'from Whitsun'

It also applies across a compound boundary (*rab*][*szolga* [ps] 'slave', lit. 'captive-servant'), across a word boundary (*nagy kalap* [ck] 'large hat') and indeed across any higher boundary as long as no pause intervenes; furthermore, as the examples in (18) show, it applies in non-derived environments as well, hence it is postlexical (but obligatory and non-rate-dependent).

Sonorants do not participate in the process: they do not voice a preceding obstruent (21a), nor do they get devoiced by a following voiceless obstruent (21b):

(21) (a) kalap-nak 'to (a) hat', kút-nak 'to (a) well', fütty-nek 'to (a) whistle' zsák-nak 'to (a) sack', széf-nek 'to (a) safe', rész-nek 'to (a) part', más-nak 'to sg else', léc-nek 'to (a) lath', csúcs-nak 'to (a) peak'

(b) szem-től 'from (an) eye', bűn-től 'from (a) sin', torony-tól 'from (a) tower', fal-tól 'from (a) wall', őr-től 'from a guard', száj-tól 'from (a) mouth'

There are two segments that behave asymmetrically with respect to this process. One is /v/ that undergoes devoicing (*szívtől* [ft] 'from (a) heart') but does not trigger voicing (*hatvan* *[dv] 'sixty'); cf. Szentgyörgyi (2000); Ritter (2000); Siptár–Törkenczy (2000, 189–205). The other is *H* that triggers devoicing (*adhat* [th] 'he may give') but does not undergo voicing before an obstruent. The usual solution for *H* is to assume that this segment is /h/ at the underlying level, specified as [− cons] (this is quite appropriate phonetically as long as [+ cons] is defined as 'constriction **in the oral cavity** at least equal to that found in fricatives') and restrict the input of voice assimilation to [+ cons, − son] segments. However, as we saw in section **2**, the glottal realization of this segment does not occur preconsonantally; what does occur is its velar realization [x]. It is this [x] that resists voice assimilation (e.g., *pechből* [xb], *[ɣb] 'out of bad luck')—but then it cannot be claimed to be specified as [− cons]. Several possibilities suggest themselves at this point, none of them very satisfactory. One would be to order the /h/-strengthening rule /h/ → [x] after voice assimilation, such that this rule, formulated as (10) above, counterfeeds voicing.[9] Another possibility would be not to restrict voice assimilation to [+ cons] segments and let /h/ undergo it (in principle, at least).[10] The solution given in Siptár–Törkenczy (2000, 79) and adopted here stipulates a filter to the effect that *[ɣ] is disallowed in Hungarian surface representations (or representations at any level, for that matter). This will do the job: we can simplify the rule of voice assimilation (by omitting [+ cons] which, without rule ordering, and especially if the underlying segment is /x/ rather than /h/, would be useless anyway), yet keep our grammar from generating *[ɣ]. Such a filter is a totally *ad hoc* device in a derivational account, but is a completely legitimate tool in an OT analysis, to which we now turn.

## 6. An OT analysis of the behaviour of *H*-type segments

As we have seen above, several possible analyses exist for the treatment of *H*-type segments in a derivational framework and some parts of such solutions seem to be *ad hoc* in such a theory. However, non-derivational approaches to grammar are different in this very respect: constraints penalizing marked segments or segment types form an organic part of Optimality Theory (OT).

[9] Both rules being postlexical, this ordering would have to be based on stipulation.

[10] Zsigri (1994) suggests to (do that and yet) exempt [x] from undergoing the rule by introducing the notion of 'phonetic quotations'. He points out that voiceless obstruents that are clearly non-Hungarian do not get voiced: *Bath-ba* [θb], *[ðb] 'to Bath', as if they were 'encapsulated' or surrounded by 'quotation marks'. He then claims that all Hungarian [x]-final lexical items are exactly like this example in that they refuse to be affected by Hungarian phonological rules (in particular, voice assimilation). This suggestion would be perfectly all right if [x]-final items were indeed few and clearly non-native. However, as we saw, this is far from being the case. We are therefore left with the solution proposed in the text.

Thus, if we assume an OT framework, a completely different solution might become available. This is exactly what we try to find out now.

One of the most important characteristics of OT is the Richness of the Base (RB), which means that there are no constraints on input forms. Or, to put it in a different way, any kind of input forms may occur in the Lexicon because of RB. Consequently, the constraint hierarchy should be such that it should select well-formed output forms whatever the input is. That is, even though an input form may contain segments or structures never occurring on the surface, the constraints should never allow these to surface; instead, they should prefer forms that are possible output forms in the particular language. This is a most important characteristic of OT as we will see in the following.

Let us first try to translate the generalisations of the last derivational solution into OT, i.e., into constraints instead of derivational rewrite rules. In this solution we assumed that $H$-type segments are underlyingly specified as voiceless dorsal fricatives, as in (7a), and are lenited into a placeless continuant in onset positions, as in (7b). Such a restriction may be directly translated into a positional markedness constraint prohibiting voiceless dorsal fricatives in onsets, i.e., the configuration described in (8a). The constraint is given in (22):

(22) ***Onset-x** Voiceless dorsal fricatives are prohibited in onsets (unless licensed).[11]

This constraint only prohibits a [x] in an onset but does not imply the repair strategy chosen by the language. This is done by some other constraints, the most relevant of which are given below.

(23) **MAX** Every input segment must have a correspondent in the output.

(24) **DEP** Every output segment must have a correspondent in the input.

(25) **IDplace** Corresponding input and output segments have identical specifications for place features.

(26) ***ɣ** No voiced dorsal fricatives in output forms.

The faithfulness constraint in (23), **MAX**, prohibits deletion of segments while the other such constraint in (24), **DEP**, does just the opposite, i.e., it penalizes epenthetic segments. Constraint (25) is a featural faithfulness constraint that

[11] Note that this constraint has to be such that it should allow for a geminate [x], i.e., an onset [x] must be allowed if it is licensed by the preceding coda [x]. Thus, the bracketed part has to be added so that we could interpret the constraint this way.

prohibits any kind of change—or deletion or addition—in the specification of place of articulation. Finally, the markedness constraint in (26) penalizes the occurrence of the relatively marked voiced dorsal fricative. Since such segments never occur in Hungarian surface forms, this constraint will probably be high ranking.

The following tableaux demonstrate the operation of the above constraints. As will be seen, in some cases the constraint hierarchy is able to select the optimal output form but there are some cases when it cannot do so.

(27)

| UR: /dox/ | *ɣ | MAX | DEP | *Onset-x | IDplace |
|---|---|---|---|---|---|
| a. ☞ dox | | | | | |
| b. do | | *! | | | |
| c. do.xɔ | | | *! | * | |
| d. doɣ | *! | | | | |
| e. doh | | | | | *! |

In tableau (27) an input with a coda /x/ is evaluated. Four of the candidates violate at least one of the constraints except for candidate (a) which, thus, wins as optimal. Candidate (d) violates the markedness constraint against voiced dorsal fricatives;[12] candidate (b) violates **MAX** since the input coda segment does not have a correspondent in the output;[13] candidate (c) violates not only the constraint prohibiting epenthesis, but also the constraint against voiceless velar fricatives in an onset. Finally, candidate (e) violates **IDplace** since the place of articulation of the input dorsal fricative is not present in the output form. Hence candidate (a) is correctly selected as optimal.

(28)

| UR: /xeːt/ | *ɣ | MAX | DEP | *Onset-x | IDplace |
|---|---|---|---|---|---|
| a. xeːt | | | | *! | |
| b. eːt | | *! | | | |
| c. ☞ seːt | | | | | * |
| d. ɣeːt | *! | | | | |
| e. ☞ heːt | | | | | * |
| f. ɛxteːt | | | *!* | | |

*ɣ, MAX, DEP, *Onset-x ≫ IDplace

[12] This candidate also violates **IDvoice** because the corresponding input and output segments, /x/ and /ɣ/, do not have the same specification for voice. Such a faithfulness constraint will play a significant role in the treatment of voice assimilation, or rather the explanation of the lack of voice assimilation. See section **7** for details.

[13] Note that this candidate also violates a syllable well-formedness or markedness constraint that does not allow short mid rounded vowels word finally.

Tableau (28) shows an input form (for *hét* 'seven') with a dorsal fricative in the onset, a configuration that is not permitted. Similarly to tableau (27), candidate (d) is ruled out because of the relatively marked segment it contains. Candidates (b) and (f) are excluded because of their respective violations of the constraints penalizing deletion and epenthesis, **MAX** and **DEP**, respectively.[14] The completely faithful candidate in (a) has a fatal violation of the positional markedness constraint, ***Onset-x**, and is ruled out. The remaining two candidates in (c) and (e) tie on all the constraints because they only violate the faithfulness constraint requiring identity of place features in input and output forms. Since the place of articulation is changed in them, although differently, they both have one violation. To have these two candidates as the best, **IDplace** must be dominated by all the other constraints, indicated by the solid line between **IDplace** and the dominating constraints. As candidate (e) is the actual surface form, there must be some other constraint that prefers it to the form in (c). Such a constraint, or rather a family of constraints, may be the one penalizing change in the identity of place of articulation features one by one, e.g., **IDdorsal**, **IDcoronal**, **IDlabial**, etc. Supposing that place features are privative, candidate (28e) violates **IDdorsal** only because of the deletion of the underlying dorsal feature. It does not violate the other such constraints since no features appear in the output form that were not present in the input. Candidate (28c), on the other hand, would violate not only **IDdorsal**, but **IDcoronal**, too, as the input-output specifications of the word initial fricative for the feature coronal are not identical. Thus, any candidate with a specified place of articulation in the output would lose to candidate (e), which is a placeless, i.e., glottal, segment.

(29)

| UR: /ʧɛx/ | *ɣ | MAX | DEP | *Onset-x | IDplace |
|---|---|---|---|---|---|
| a. ☹ ʧɛx | | | | | |
| b. ʧɛh | | | | | *! |
| c. ʧɛ | | *! | | | |

(30)

| UR: /ʧɛx+Vk/[15] | *ɣ | MAX | DEP | *Onset-x | IDplace |
|---|---|---|---|---|---|
| a. ʧɛxɛk | | | | *! | |
| b. ☞ ʧɛhɛk | | | | | * |
| c. ʧɛɛk | | *! | | | |

[14] A candidate like [ɛ.xeːt] would violate **DEP** only once, but would also violate ***Onset-x**; it would similarly turn out to be suboptimal.

[15] The surface quality of the suffix vowel may be partially predicted on the basis of the last stem vowel, i.e., by the rules/constraints governing vowel harmony (cf. Ringen – Vago

Tableaux (29) and (30) show one of the words that surface without the underlying /x/ in coda position, i.e., the coda /x/ is deleted, but with a surface [h] in onset position when followed by a vowel initial suffix. As can be seen in (30) containing the suffixed form, candidate (c) is ruled out by **MAX** because the input stem final fricative does not have a surface correspondent. Candidate (a) has a fatal violation of ***Onset-x**, while candidate (b), the actual surface form, only violates the lower ranked **IDplace** because of the missing output dorsal specification.

Unfortunately, in tableau (29) showing the bare stem, it is not the actual surface form that is selected as optimal (this is indicated by '☹' in the tableau). Candidate (b) is ruled out because of the input dorsal specification missing in the output and candidate (c), the actual surface variant, is excluded by **MAX** because of the deletion of the /x/. It seems then that our constraint hierarchy is unable to cope with the above form and the others in its class. Note, however, that as we have already mentioned at the beginning of section **3**, *cseh* is one of the exceptional stems that behave differently from the normal /x/-final stems, e.g., *doh*, in that their /x/ is deleted in a coda. Thus, whatever kind of solution we propose, derivational or not, these stems will have to be marked as exceptional in the Lexicon.

One of the advantages of OT is that there is a way to deal with exceptional forms: they are not different from normal forms in that the constraints are not valid for them; rather the constraints are evaluated the same way but in a different hierarchy, i.e., the constraints may be reranked for exceptional lexical items. This means then that exceptions are marked for the reranking of certain constraints. This is what we turn to now.

(31) ***x** Voiceless dorsal fricatives are prohibited.

(32) ***Coda-h** Voiceless glottal fricatives are prohibited in codas.

The constraint in (31) prohibits [x] in the output. Since such segments normally occur in surface forms, it has to be ranked low, at least below **IDplace** (cf. (27)), in the case of normal stems, i.e., the ones that do not have /x/-deletion in coda position unlike the one in (29). This way, ***x** will never have an effect on the evaluation of the candidates in normal stems. The constraint in (32) is needed for independent reasons since if an input form contains a coda /h/, which may occur because of RB, then such a positional constraint

(1998); Siptár – Törkenczy (2000) and Szentgyörgyi (2000), for instance). We are not going to discuss the input quality of the vowel and whether it is part of the input or it is epenthetic.

is needed to rule such output forms out. Note that the positional markedness constraints (22) and (32) are exactly the ones mentioned in the discussion of the distribution of $H$-type segments in (8a) and (8b). $H$-deleting stems on the other hand are marked for the reranking of the constraints: if ***x** dominates **MAX** then the actual surface forms win as shown below.

(33) $H$-deleting words are marked for the reranking:
***x ≫ MAX**

(34)

| UR: /ʧɛx/ | *ɣ | *Onset-x | *Coda-h | *x | MAX | IDplace |
|---|---|---|---|---|---|---|
| a. ʧɛx | | | | *! | | |
| b. ʧɛh | | | *! | | | * |
| c. ☞ ʧɛ | | | | | * | |

*x, *Coda-h ≫ MAX

Tableau (34) shows the effect of adding the positional markedness constraint (32) and the reranking shown in (33) required by an $H$-deleting stem. The fully faithful candidate in (34a) is ruled out by the reranked ***x** constraint. Candidate (b) containing a glottal fricative violates the newly added positional markedness constraint, ***Coda-h**. The actual output form only violates **MAX** because of the deleted stem final segment.

(35)

| UR: /ʧɛx+tö:l/ | *ɣ | *Onset-x | *Coda-h | *x | MAX | IDplace |
|---|---|---|---|---|---|---|
| a. ʧɛx.tö:l | | | | *! | | |
| b. ʧɛh.tö:l | | | *! | | | * |
| c. ☞ ʧɛ.tö:l | | | | | * | |

Tableau (35) shows the same stem followed by a consonant initial suffix. Candidates (a) and (b) are ruled out by ***Coda-h** and ***x** respectively and thus allow candidate (c), the actual surface form, to win.

It remains to show that if a normal stem ending in a /x/ is followed by a vowel initial suffix, the underlying /x/ surfaces as [h] but it stays [x] before consonant initial suffixes.

(36)

| UR: /dox+Vʃ/ | *ɣ | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|---|
| a. do.xoʃ | | *! | | | | * |
| b. ☞ do.hoʃ | | | | | * | |
| c. do.oʃ | | | | *! | | |

Candidates (a) and (c) are ruled out by ***Onset-x** and **MAX** respectively, while the actual surface form only violates the lower ranking **IDplace** dominated by the constraints violated by the other candidates. This way, candidate (b) is correctly selected as optimal.

(37)

| UR: /dox+toːl/ | *ɣ | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|---|
| a. ☞ dox.toːl | | | | | | * |
| b. doh.toːl | | | *! | | * | |
| c. do.toːl | | | | *! | | |

Candidates (37b) and (37c) both violate some of the highest ranked constraints, ***Coda-h** and **MAX** respectively. This way, candidate (a), the actual surface form, is correctly allowed to be selected as optimal.

Thus we can conclude that so far we have been able to prove that supposing an underlying /x/ all kinds of forms may be accounted for if we assume that *H*-deleting stems are marked for the reranking of ***x** $\gg$ **MAX**.

Let us now turn to the problem of the Richness of the Base. As a result of RB, it is not only /x/ that may occur underlyingly, but also /h/. We have to show that even in such cases the constraint hierarchy is able to predict the correct surface forms. Then we will show how the input forms are selected by Lexicon Optimization (LO).[16]

(38)

| UR: /doh/ | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|
| a. ☞ dox | | | | * | * |
| b. doh | | *! | | | |
| c. do | | | *! | | |

Tableau (38) demonstrates what happens if a stem whose surface form ends in [x] contains an underlying /h/ stem finally. The fully faithful candidate in (38b) is ruled out by ***Coda-h** while candidate (38c) is excluded because of a **MAX** violation, i.e., the underlying stem final /h/ not having a surface correspondent. This way, candidate (38a) is correctly selected as optimal.[17]

(39)

| UR: /doh+Vʃ/ | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|
| a. do.xoʃ | *! | | | * | * |
| b. ☞ do.hoʃ | | | | | |
| c. do.oʃ | | | *! | | |

[16] Candidates violating ***ɣ** are not shown. ***ɣ** and **DEP** are left out of the tableaux unless relevant.

[17] We should bear in mind that other candidates containing a labial or a coronal fricative (**dof, *dos*, etc.) are also evaluated. However, since **IDplace** is just a shorthand for a family of constraints, **IDlabial**, **IDcoronal** and **IDdorsal**, these candidates would incur more violations than the optimal one. For details see the discussion after tableau (28).

Tableau (39) shows the same stem followed by a vowel initial suffix, where the surface quality of the vowel is determined by constraints governing vowel harmony as above. Candidate (a) containing a voiceless dorsal fricative incurs a fatal violation of ***Onset-x**, while candidate (c) violates **MAX** fatally. Again, the actual surface form in (b), which is also the fully faithful candidate in this case, is selected as optimal.

(40)

| UR: /doh+toːl/ | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|
| a. ☞ dox.toːl | | | | * | * |
| b. doh.toːl | | *! | | | |
| c. do.toːl | | | *! | | |

Similarly to the above, a normal stem ending in an *H*-type segment is predicted to behave the same way before a consonant initial suffix if we assume an underlying /h/ stem finally as shown in (40). Since the violations of the highest ranked constraints do not depend on what the underlying stem final segment is, they are exactly the same as in tableau (37) containing the same stem with underlying /x/. Thus, the same output form, the actual surface form, is selected as optimal once again.

(41)

| UR: /heːt/ | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|
| a. xeːt | *! | | | * | * |
| b. eːt | | | *! | | |
| c. ☞ heːt | | | | | |

Tableau (41) contains a word starting with an *H*-type segment, which always surfaces as a placeless (glottal) continuant. This prediction is borne out by the constraint hierarchy in the tableau since candidate (a) containing a dorsal fricative and the unfaithful candidate (b) containing no correspondent of the input /h/ violate ***Onset-x** and **MAX** respectively, allowing candidate (c) to win.

Let us now turn to exceptional *H*-deleting stems like *cseh* 'Czech' and see how they behave in various environments.

(42)

| UR: /ʧɛh/ | *Onset-x | *Coda-h | *x | MAX | IDplace |
|---|---|---|---|---|---|
| a. ʧɛx | | | *! | | * |
| b. ʧɛh | | *! | | | |
| c. ☞ ʧɛ | | | | * | |

In tableau (42), the bare *H*-deleting stem is shown without any suffix. In such cases, the stem final *H* should be dropped and this is exactly what we see in the optimal candidate, (42c). The other two candidates are ruled out by higher ranked constraints, namely ***Coda-h** and ***x**. We must bear in mind that, as we have noted above, *H*-deleting stems are lexically marked for the reranking of ***x** $\gg$ **MAX**. As a result of this reranking, the violation of **MAX** by the optimal candidate is less serious than either the violation of ***Coda-h** by (42b) or that of ***x** by candidate (42a).

(43)

| UR: /ʧɛh+Vk/ | *Onset-x | *Coda-h | *x | MAX | IDplace |
|---|---|---|---|---|---|
| a. ʧɛ.xɛk | *! | | * | | * |
| b. ☞ ʧɛ.hɛk | | | | | |
| c. ʧɛ.ɛk | | | | *! | |

The same stem behaves differently if followed by a vowel initial suffix as shown in (43). In such environments the stem final *H* is syllabified into the onset of the next syllable and thus surfaces as [h] as in candidate (43b), the optimal output form. Candidate (43a) violates ***Onset-x** and ***x** because of the dorsal continuant syllabified in the onset while candidate (43c) violates **MAX** because of the input /h/ being unparsed.

(44)

| UR: /ʧɛh+tö:l/ | *Onset-x | *Coda-h | *x | MAX | IDplace |
|---|---|---|---|---|---|
| a. ʧɛx.tö:l | | | *! | | * |
| b. ʧɛh.tö:l | | *! | | | |
| c. ☞ ʧɛ.tö:l | | | | * | |

Finally, tableau (44) demonstrates what happens to the same type of stem if a consonant initial suffix is added. As can be seen, the hierarchy selects the actual output form as optimal again, ruling out candidates (44a) and (44b) because of the violations of ***x** and ***Coda-h**, respectively. In comparison, the optimal candidate only violates the relatively low ranked **MAX** constraint because of the /h/ not having a surface correspondent.

Thus, we can conclude that whatever the input, whether /h/ or /x/, the constraint hierarchy always selects the actual surface forms as optimal both for normal stems and *H*-deleting stems, provided that the latter are marked for the reranking of ***x** $\gg$ **MAX**.

The next problem to be discussed is that of selecting the best input form, i.e., the one closest to the optimal output form. This is performed by Lexicon Optimization. Since the words ending in an *H*-type segment may have a surface [x], [h]—or nothing in the case of *H*-deleting stems—, we have to use the context sensitive version of LO as discussed in Inkelas (1994), which compares the violations for all kinds of possible environment types and ranks the different input forms accordingly.

Let us first re-examine normal stems ending in an $H$-type segment concerning the violations depending on the input forms.

(45)

| UR's | Sample environments | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|---|
| a. /dox/ | dox | | | | | * |
| | do.hoʃ | | | | * | |
| | dox.toːl | | | | | * |
| b. /doh/ | dox | | | | * | * |
| | do.hoʃ | | | | | |
| | dox.toːl | | | | * | * |

The tableau in (45) is a summary of the violations incurred by the winning candidates generated from underlying /dox/ or /doh/ in various environments, i.e., it repeats the relevant candidates (27a), (36b), (37a), (38a), (39b) and (40a). As can be seen in (45a), the optimal candidates incur one violation of **IDplace** in the three logically possible environment types: word final, prevocalic and preconsonantal. It is so because it is only in the prevocalic environment, i.e., when the surface segment is [h], that the place of articulation of the underlying /x/ has to be changed under the pressure of the higher ranked constraints. On the other hand, in (45b), the phonetically identical optimal output candidates incur two violations of **IDplace** as the underlying /h/ has to be changed into [x] both in word final and preconsonantal position because of the high ranked contextual markedness constraint ***Coda-h**. As a result of this we can conclude that it is in the case of (45a), i.e., underlying /dox/, that the optimal output candidates incur the fewest violations of the constraint hierarchy proposed. Thus, the alternation sensitive version of LO selects /dox/ as the optimal input form on the basis of the optimal output forms. Of course, the same is true of all normal stems ending in an $H$-type segment.

Let us turn to the exceptional stems and see what the prediction is if the reranking of ***x** $\gg$ **MAX** is performed.

(46)

| UR's | Sample environments | *Onset-x | *Coda-h | *x | MAX | IDplace |
|---|---|---|---|---|---|---|
| a. /ʧɛx/ | ʧɛ | | | | * | |
| | ʧɛ.hɛk | | | | | * |
| | ʧɛ.töːl | | | | * | |
| b. /ʧɛh/ | ʧɛ | | | | * | |
| | ʧɛ.hɛk | | | | | |
| | ʧɛ.töːl | | | | * | |

As tableau (46) suggests the situation is different from that of normal stems: in *H*-deleting stems the number of **MAX** violations is the same for output candidates in the case of the two underlying forms but while there is no violation of **IDplace** if the UR ends in a /h/, there is one violation if it ends in /x/. As a result, the UR ending in /h/, /ʧɛh/ is selected as optimal over /ʧɛx/.

The last type of stem is non-alternating: these stems contain an *H*-type segment either in initial or medial position where no alternation resulting from suffixation is possible. In these cases, LO always selects the input identical to the non-alternating output form. We demonstrate this with two examples below, *hét* [heːt] 'seven' and *jacht* [jɒxt] 'yacht'.

(47)

| a. /heːt/ | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|
| heːt | | | | | |
| b. /xeːt/ | | | | | |
| heːt | | | | * | |

Since in (47b) the output candidate violates **IDplace** because of the discrepancy between the place features of the input /x/ and its output correspondent [h] while the optimal candidate in (47a) does not incur any violations, LO selects (47a) as the lexical representation of the stem.

(48)

| a. /jɒht/ | *Onset-x | *Coda-h | MAX | IDplace | *x |
|---|---|---|---|---|---|
| jɒxt | | | | * | * |
| b. /jɒxt/ | | | | | |
| jɒxt | | | | | * |

In contrast to (47), where a non-alternating stem has an underlying /h/, (48) displays a non-alternating stem which has underlying /x/ according to LO. Both the output forms in (48a) and (48b) violate ***x** but only (48a) incurs a violation of **IDplace** since underlying /h/ corresponds to surface [x] there. Thus, the UR of (48b) is selected as the lexical representation for this stem.

In conclusion to this section it can be said that the OT approach to the problem provides us with a solution dispreferred by the derivational approach, namely that both underlying /x/ and /h/ can be found in Hungarian. Note that this is not an arbitrary stipulation but rather a consequence of the application of Lexicon Optimization to phonetically identical optimal candidates arising from different underlying forms.

## 7. Voice assimilation and *H*-type segments in OT

In this section, we are going to show how the above OT solution also provides valuable insight to the behaviour of *H*-type segments with respect to voice assimilation.

Recall from the previous section that a constraint penalizing voiced dorsal fricatives, ***ɣ**, is necessary to rule out candidates containing this segment. As we will see below such a constraint is crucial for the analysis of voice assimilation in terms of OT.

We will base our account on Petrova et al's (2001) analysis of voice assimilation and other laryngeal phenomena. According to their approach, Hungarian voice assimilation can be described by the constraints in (49)–(53) if they are ranked as in (54) except for /v/ and *H*-type segments, which behave asymmetrically: the former undergoes voice assimilation but does not trigger it while the latter (set) does trigger it but does not undergo it.

| | | |
|---|---|---|
| (49) | **IDvoice** | Corresponding input and output segments have identical specifications for voice. |
| (50) | **IDpreson voice** | Corresponding input and output segments before a sonorant have identical specifications for voice. |
| (51) | **IDwf voice** | Corresponding segments in word final position have identical specifications for voice. |
| (52) | **Share** | Obstruents in a cluster share their voice specifications. |
| (53) | ***voice** | No voiced obstruents. |

(54) **Share, IDpreson voice** $\gg$ **IDwf voice** $\gg$ **IDvoice** $\gg$ ***voice**

The highest ranked **Share** constraint ensures that there is always voice assimilation in obstruent clusters while the positional faithfulness constraints govern the direction of the assimilation: it is always the segment before a sonorant or a word final segment, i.e., the rightmost obstruent in the cluster, that must be faithful to its underlying voice specification and thus triggers regressive assimilation. **IDvoice** and especially ***voice** will not play a significant role since they are ranked too low in the hierarchy to interfere with the selection of the optimal candidate.

First, let us see how words containing *H*-type segments in a cluster behave according to Petrova et al's constraint hierarchy and then decide where our constraints should be placed in the hierarchy, still observing the dominance relations determined so far.

(55)

| UR: /dox+bɒn/[18] | Share | IDpreson voice | IDwf voice | IDvoice | *voice |
|---|---|---|---|---|---|
| a. dox.bɒn | *! | | | | ** |
| b. doh.bɒn | *! | | | | ** |
| c. ☹ doɣ.bɒn | | | | * | *** |
| d. dox.pɒn | | *! | | * | * |

Tableau (55) contains a normal stem ending in an *H*-type segment followed by a voiced obstruent initial suffix, i.e., a potential cluster for voice assimilation. The input form is the one chosen by the alternation sensitive Lexicon Optimization as selected in (45) above. Tableau (55) shows that the constraint hierarchy that gives the right predictions for obstruent clusters in general does not pick the actual surface form, (55a), as optimal. Since this candidate violates one of the highest ranking constraints, there must be a constraint dominating all the ones in (55) to rule out the incorrect forms.

We have already seen that there is independent evidence for the two markedness constraints ***ɣ** and ***Coda-h**. If we assume that these constraints, which were shown to be high ranking among those responsible for the distribution of *H*-type segments, are ranked above **Share**, then the correct result is achieved as indicated in (56).[19]

(56)

| UR: /dox+bɒn/ | *ɣ | *Coda-h | Share | IDpreson voice | IDvoice | *voice |
|---|---|---|---|---|---|---|
| a. ☞ dox.bɒn | | | * | | | ** |
| b. doh.bɒn | | *! | * | | | ** |
| c. doɣ.bɒn | *! | | | | * | *** |
| d. dox.pɒn | | | | * | *! | * |

*ɣ, *Coda-h ≫ Share

In this modified tableau we can see the result of adding the two markedness constraints to Petrova et al's (2001) hierarchy in an undominated position. Candidates (56b) and (56c) violate these constraints and are thus ruled out.

[18] The harmonising suffix vowel is most probably [− back] underlyingly since it always occurs with that value on the surface when used as a root, e.g., *bennem* [bɛnːɛm] 'in me'. For the sake of simplicity we use the back vowel variant as underlying after back stems and the front vowel variant after front stems in the tableaux. See Ringen – Vago (1998) for details.

[19] We may also assume that all the constraints used to predict the distribution of *H*-type segments dominate all the constraints governing voice assimilation although it is not necessary. The only ranking between the two blocks of constraints we have to assume so far is ***ɣ**, ***Coda-h** ≫ **Share**.
Note furthermore that **IDwf voice** is not shown in the tableau since the relevant cluster is not word final; thus the constraint cannot play a role.

Candidates (a) and (d) violate **Share** and **IDpreson voice** respectively but since these two constraints are not crucially ranked with respect to each other, these violations count as equal. Decision between the two candidates is passed on to the next constraint, **IDvoice**, which is fatally violated by candidate (d) but satisfied by (a), the fully faithful candidate, the actual surface form.

Let us now turn to *H*-deleting stems and see how they behave in this respect. Since the stem final *H* is deleted before consonants and a pause, it will not assimilate to a following obstruent, e.g., *cseh* ~ *csehben* [ʧɛ] ~ [ʧɛbɛn].

(57)

| UR: /ʧɛh+bɛn/ | *ɣ | *Coda-h | *x | MAX | Share | IDpreson voice | IDvoice | *voice |
|---|---|---|---|---|---|---|---|---|
| a. ʧɛx.bɛn | | | *! | | * | | | * |
| b. ʧɛh.bɛn | | *! | | | * | | | * |
| c. ʧɛɣ.bɛn | *! | | | | | | * | ** |
| d. ʧɛx.pɛn | | | *! | | | * | * | |
| e. ☞ ʧɛ.bɛn | | | | * | | | | * |

*ɣ, *Coda-h ≫ MAX

In (57) we have shown some of the rest of the proposed constraints relevant for *H*-type segments. We have already seen that *H*-deleting stems are marked for the reranking of ***x** ≫ **MAX**. Assuming this reranking and that these constraints together with ***ɣ** and ***Coda-h** dominate the ones responsible for voice assimilation,[20] we get the desired result. Candidates (57a–d) violate the three highest ranked constraints, the ones responsible for the distribution of *H*-type segments. Since candidate (57e) only violates **MAX** (and the lowest ranked ***voice**), it is correctly selected as optimal.

Finally we have to show that the hierarchy established above does not interfere with an *H*-type segment triggering regressive voice assimilation. This is what can be seen in (58).

(58)

| UR: /haːz+hoz/ | *ɣ | *Onset-x | MAX | Share | IDpreson voice | IDvoice | *voice |
|---|---|---|---|---|---|---|---|
| a. haːz.hoz | | | | *! | | | ** |
| b. ☞ haːs.hoz | | | | | | * | * |
| c. haːz.xoz | | *! | | * | | | ** |
| d. haːz.ɣoz | *! | | | | * | * | *** |
| e. haː.zoz | | | *! | | | | ** |

[20] **MAX** does not have to dominate **Share** according to (56) but in general we can claim that **MAX** ≫ **Share** since in no other case are segments deleted to avoid violating Share, not even in the case of the other segment exceptional for voice assimilation, /v/.

In the input in (58), a stem final voiced obstruent is followed by an underlying /h/ as determined by LO. Since /h/ is rightmost in the cluster, it will trigger regressive assimilation. This prediction is actually borne out in the tableau. Candidates (c) and (d) violate ***Onset-x** and ***ɣ**, two markedness constraints, respectively, and these violations are fatal. Candidate (a) is fully faithful to the input and thus contains an obstruent cluster with heterogeneous voice, a clear violation of **Share**. Candidate (e), on the other hand, violates **MAX** because of the unparsed /h/ of the suffix, also a fatal violation. This way, candidate (b) is correctly allowed to win.

## 8. Conclusion

To sum up, it can be said that although the three derivational analyses proposed in the first part of the paper have the descriptive power to explain the distribution of $H$-type segments, they all suffer from similar shortcomings addressed in section **4**. On the other hand, the OT analysis presented in sections **6** and **7** can account for all the phenomena involving $H$-type segments, the [x] ~ [h] alternations, $H$-deleting stems, and the asymmetric behaviour of $H$-type segments in voice assimilation as well, without having to make unreasonable stipulations. This is achieved by a hierarchy of constraints made up of both general, e.g., ***x** and ***ɣ**, and positional markedness constraints, e.g., ***Coda-h** and ***Onset-x**, and some faithfulness constraints, e.g., **IDplace**, **MAX** and **DEP**. The exceptional class of $H$-deleting stems can simply be treated by a reranking of two constraints, ***x** $\gg$ **MAX**, one of the most straightforward ways of dealing with exceptionality in OT. Also, the role of $H$-type segments in voice assimilation is described without stipulating any new constraints: the hierarchy proposed by Petrova et al. (2001) for the treatment of voice assimilation in a number of languages including Hungarian amended by the constraints suggested by us to account for the distribution of $H$-type segments is sufficient to deal with this problem, too.

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# HUNGARIAN BOOKS ON LINGUISTICS

**László Kálmán: Konstrukciós nyelvtan. Segédkönyvek a nyelvészet tanulmányozásához VIII. Nem transzformációs nyelvtanok III [Construction Grammar. Supplementary textbooks on linguistics 8. Non-transformational grammars 3]**. Tinta Könyvkiadó, Budapest, 2001. 98 pp.

Construction Grammar is one of the most popular non-derivational approaches to linguistic theory currently on the market. It originates from Charles Fillmore and Paul Kay's (Berkeley, CA) seminal lectures and papers. It revives the traditions of structuralist grammar: it denies the claim that the aim of grammar should be modelling the ability to draw a distinction between 'grammatical' and 'ungrammatical' expressions. Instead, it emphasises the fact that speakers are capable of associating linguistic forms with meanings in a systematic, conventional fashion, and it claims that this is the capacity that should be explained by grammar.

The building blocks of a construction grammar are elementary associations (called 'constructions' or simply 'signs') establishing links between form types and meaning types. In this way, we can generalise over many types of idiosyncratic signs in language. A one-word lexical entry, a multi-word idiom, an idiom with open slots (a phrasal idiom or idiom schema), and even a syntactic or prosodic pattern may qualify as the formal aspect of a construction inasmuch as it is conventionally associated with some type of meaning.

As a side effect, the structure of expressions need not be strictly linear nor strictly hierarchical: the formal characteristics of the constructions an expression embodies may overlap, and there may be 'suprasegmental' and 'long-distance' constructions.

The first Hungarian book on Construction Grammar is the outcome of a series of one-term introductory courses on the topic. The author attempts to present both the theoretical foundations and some of the empirical consequences of the constructionist view. He starts by explaining the historical roots of and the general perspective taken by Construction Grammar (Chapter 1). Then, in Chapter 2, he raises some theoretical questions and attempts to answer them, namely, how the particular construction grammar of a language is built up, how sentence generation and parsing might work in a constructionist setting, what the status of grammaticality is in the theory, how compositionality can be achieved in it, what universals of grammar there can be, and how a construction grammar can possibly be acquired by children.

Chapters 3–4 elaborate on technical problems in describing constructions. Chapter 3 explains possible approaches to the formal side of constructions (i.e., the nature of phonological and structural descriptions) and to their semantic side. Chapter 4 is about formalisms to express systems ('networks') of constructions in a logical language which can also express partial similarities between constructions.

Chapter 5 is an overview of how several problems in traditional and generative grammars have led scholars to adopting a constructionist stance. Finally, Chapter 6 proposes particular analyses that intend to illustrate the expressive power and elegance of Construction Grammar. In particular, some puzzling aspects of sentence structures (discontinuous and ambiguous constituency, the mismatch between phonological and syntactic constituents, etc.), the amazing variety of idiomatic expressions, and the nature of non-derivational phonology are presented through example problems and ways to solve them.

**László Kálmán (ed.): Magyar leíró nyelvtan. Mondattan I. Segédkönyvek a nyelvészet tanulmányozásához VI [A descriptive grammar of Hungarian. Syntax 1. Supplementary textbooks on linguistics 6].** Tinta Könyvkiadó, Budapest, 2001. 196 pp.

As the ambitious title, *A descriptive grammar of Hungarian, Syntax 1*, already suggests, this book (henceforward 'DGH') is meant to be the first volume of a series covering all areas of Hungarian grammar. DGH is the first publication resulting from a research project on the grammar of Hungarian. The project participants are researchers of the Research Institute for Linguistics of the Hungarian Academy of Sciences, members of the Department of Theoretical Linguistics at Eötvös Loránd University of Budapest as well as postgraduate students at the Theoretical Linguistics Program of the department. The project was initiated by Professor László Kálmán who has also been the leader of the research team and not surprisingly the editor as well as one of the authors of the volume. The other authors of DGH, Zoltán Bánréti, Kálmán Dudás, Beáta Gyuris, László Kálmán, Attila Novák and Viktor Trón reflect the diversity of the research group.

The declared aim of DGH is to pave the way for a modern reference grammar of the Hungarian language, and to ultimately replace the so called 'Academic Grammar'. The latter is the only broad-coverage reference grammar available for Hungarian and is the canonised one in Hungarian higher education. However, owing to its outdated methodology and various inconsistencies, it calls for an alternative. DGH is the first step in that direction. The ten chapters of DGH cover major issues in Hungarian clause-level syntax, among others topic–comment articulation and focus, the syntactic properties of various clause types, quantifier scope, subordination, coordination and ellipsis. This reflects the aim of the authors to construct a grammar from outside in, i.e., starting from the sentential macro-structure and proceeding toward phrase structure, word structure, and finally sound structure of the language. The first volume of the series does not cover the entire syntax of Hungarian and is expected to be followed by at least one additional volume on syntactic matters, phrase structure in particular.

The assumed audience of DGH is the linguist, though the book is also accessible by the interested non-professional. DGH is free of any bias in favour of a specific linguistic paradigm as well as attempts to remain neutral and therefore somewhat unorthodox in its terminology. The authors experiment with a naive, explorative way of describing grammatical constructions, which make the book an enjoyable and easy to follow reading. Apart from addressing major (core) syntactic phenomena, DGH consistently discussses special minor (peripheral) constructions also, many of which have never been described or even mentioned earlier in the literature. All this makes DGH a compulsory companion of the linguist working on Hungarian syntax, a rather promising start.

Contents: Introduction, The Hungarian simple sentence, The topic and the contrastive topic, The verb carrier, Fields before the comment, Disambiguation of quantifier scope, The question in Hungarian, Exclamations with question words, The relative clause, Subordination of finite clauses, Ellipsis.

**László Kálmán – Viktor Trón – Károly Varasdi (eds): Lexikalista elméletek a nyelvészetben. Segédkönyvek a nyelvészet tanulmányozásához XIII [Lexicalist theories in linguistics. Supplementary textbooks on linguistics 13].** Tinta Könyvkiadó, Budapest, 2002, 372 pp.

This collection is the thirteenth volume in the series *Segédkönyvek a nyelvészet tanulmányozásához* published by Tinta Könyvkiadó, and, in accordance with the title of the series, is a textbook on the aspects of modern linguistic theorizing concerning the lexicon. It is worth noting that most papers in the book were written by graduate students of the Theoretical Linguistics Ph.D. Programme run jointly by Eötvös Loránd University Budapest and the Research Institute for Linguistics of the Hungarian Academy of Sciences. The book is divided into three main parts: Phonology, Syntax, and Semantics. The Phonology part covers various phonological theories that, beside concentrating on the structure of the lexicon, have had a great influence on computational phonology as well. The Syntax section explains the backbones of such lexically oriented theories as LFG and HPSG as well as the perhaps less well-known Construction Grammar. Complying with the maxim *Audiatur et altera pars*, the editors of the book included a chapter on GB, a distinctively non-lexical grammar theory, too. The Semantics part explains the outlines of Ray Jackendoff's influential approach to lexical semantics, and considers two phenomena whose explanation would hardly be possible without a highly structured notion of lexicon: vagueness (as opposed to ambiguity), and metonymy. The last chapter of the section deals with the possibility and consequences of lexical decomposition. Finally, the book contains an Appendix in which the formal means used in the book are explained.

Contents: Foreword (László Kálmán); [Lexical phonology:] Introduction (Péter Rebrus), Modelling phonology with finite state devices (Péter Dienes), Lexical Phonology (Zsuzsanna Bárkányi), Three-level phonology (Ágnes Lukács), HPSG phonology (Attila Novák); [Syntax:] Introduction (László Kálmán); The Lexicon in LFG (Boldizsár Eszes), HPSG (Viktor Trón), Government and Binding Theory (Kálmán Dudás), Argument-structure in Construction Grammar (Gábor Rádai); [Lexical semantics:] Introduction (László Kálmán); Conceptual Structures in the Lexicon (Károly Varasdi), Ambiguous or vague? (Attila Novák), Metonymy (Viktor Trón), Lexical Decompositional Grammars (Gábor Rádai); [Appendix:] Attribute–value structures (Viktor Trón), Mathematical tools (Péter Dienes); Index; Bibliography.

**István Kenesei – Péter Siptár (eds): Approaches to Hungarian, Volume 8. Papers from the Budapest Conference**. Akadémiai Kiadó, Budapest, 2002, 329 pp.

The series *Approaches to Hungarian* arrived at a new milestone in its story of seventeen years. It all started in 1985 as a limited attempt at making available to a non-Hungarian speaking audience some of the results of recent investigations into the descriptive and theoretical aspects of this language. Volume 1 communicated the current state of descriptive studies, broken down into chapters according to the division of the grammar of Hungarian. Volume 2 was a collection of papers on issues making the "news" of the day, such as configurationality and the NP/DP problem. Volume 3 was also compiled on the basis of contributions solicited. The editors' aim was to bring together practitioners of various schools from Government and Binding Theory to Functional Grammar, and to provide an opportunity to young researchers to publish their work.

In 1992, a conference on the structure of Hungarian was organised at the Department of Uralic and Altaic Studies of the University of Bloomington. That conference was the first turning point in the history of the series, as it was resolved that the proceedings would appear as its Volume 4. Then the University of Szeged offered to organise another symposium, making the Bloomington initiative first of a series and thus inaugurating the International Conferences on the Structure of Hungarian with alternate venues in and outside Hungary. From Volume 5 on it has been these conferences that provided the substance for *Approaches.* After Szeged in 1994 came Amsterdam in 1996 (reported in Volume 6), then in Pécs in 1998 (Volume 7, see ALH 49 : 143–4).

The 5th International Conference on the Structure of Hungarian took place in Budapest between May 24 and 26, 2001. Of the thirty-two talks presented at the conference, a selection of thirteen papers were published as Volume 8 of the series. The previous volumes had been published by the University of Szeged (formerly called József Attila University), and they were regarded as collections of working papers. From the present volume onwards, Akadémiai Kiadó took over the publication of the series, making it available for a wider readership in and outside Hungary.

The papers in this collection are divided into three sections: Syntax, Semantics/Pragmatics, and Phonology. While it is the language that constitutes the ultimate common subject-matter, there are a number of topics that recur in the papers. One is negation, which is discussed in four articles from various aspects: it certainly transpires that the notorious puzzle of negative concord versus double negation is far from being settled. Moreover, the observations concerning the behaviour of negative polarity items will undoubtedly add to our understanding of the phenomenon. In addition to Katalin É. Kiss's, Genovéva Puskás's and Balázs Surányi's papers on negation, we might also group here Anna Szabolcsi's on the interpretation of disjunctions, although it is in the section on Semantics and Pragmatics. Another recurring topic is the issue of infinitives, which figures in two articles. Huba Bartos has dicovered a previously unanalysed use of the infinitive in root clauses, while Ildikó Tóth discusses inflected infinitival clauses. A related issue is the question of the dative case, which has an important role in infinitivals as well, as is witnessed by Dieter Wunderlich's paper. As is well-known, nouns are also capable of taking arguments; Tibor Laczkó puts forward an analysis of such DP-structures in the framework of Lexical-Functional Grammar. Focus is presented from a new perspective in Daniel Wedgwood's contribution: he makes use of Relevance Theory. Beáta Gyuris offers an alternative to the accepted view of contrastive topics in the literature.

The phonology section contains three papers of which Nancy A. Ritter's is a data-oriented survey of the distribution of the vowel-initial and the $j$-initial variants of the third person singular/plural forms of the possessive suffix, providing quantitative proof of certain phonological generalisations that determine the choice of suffix variant. Krisztina Polgárdi's paper argues for a "loose CV" (as opposed to "strict CV") account of superheavy syllables in Hungarian, proposing to loosen the strict CV idea at word edges and to allow words to end in a consonant instead of an empty nucleus. Finally, Miklós Törkenczy discusses the phenomenon of absolute phonological ungrammaticality and the way in which two output-biased theories, standard derivational phonology and Optimality Theory, are (or are not quite) able to meet the challenge that this curious phenomenon represents for them.

Contents: [Syntax:] Root infinitives (Huba Bartos), Negative quantifiers and specificity (Katalin É. Kiss), The structure of Hungarian DPs revisited (Tibor Laczkó), On negative licensing contexts and the role of n-words (Genovéva Puskás), Negation and the negativity of n-words in Hungarian (Balázs Surányi), Can the Hungarian infinitive be possessed? (Ildikó Tóth), On the nature of dative in Hungarian (Dieter Wunderlich), [Semantics and pragmatics:] Contrastive topics and alternatives in Event Semantics (Beáta Gyuris), Hungarian disjunctions and positive polarity (Anna Szabolcsi), 'Focus position' and quantification: the relevance of pragmatic theory (Daniel Wedgwood), [Phonology:] Hungarian superheavy syllables and the strict CV approach (Krisztina Polgárdi), The Hungarian personal possessive suffix revisited (Nancy A. Ritter), Absolute phonological ungrammaticality in output-biased phonology (Miklós Törkenczy).

**András Komlósy: A lexikai-funkcionális grammatika mondattanának alapfogalmai. Segédkönyvek a nyelvészet tanulmányozásához VII. Nem transzformációs nyelvtanok I [Basic concepts of syntax in Lexical-Functional Grammar. Supplementary textbooks on linguistics 7. Non-transformational grammars 1]**. Tinta Könyvkiadó, Budapest, 2001, 123 pp.

This is the first book-sized treatment of Lexical-Functional Grammar (LFG) ever published in Hungarian. It can be used both as an introductory textbook to the study of syntax in the framework of "classical" Lexical-Functional Grammar and as a glossary of the basic theoretical and technical notions of that syntactic model. In addition to the definitions of the concepts, it contains explanatory clarifications and illustrations to those definitions. The task of a textbook is realised by the arrangement of the definitions, in which graduality, "monotonicity" of information growth is strictly observed. Contents: Foundations (General ideas, General characterisation of representational levels, Principles and constraints), Form of syntactic representations (Universal principles of categorial structure, Attributes and values, Groupings of grammatical functions, Form of expressions encoding syntactic information, Encoding of syntactic information in syntax, About lexical entries, Encoding of syntactic information in the lexicon: lexical mapping theory), Control and anaphoric binding (Overview, Functional control, Anaphoric binding, Constructions involving extraposition ('constituent control')), Lexical processes (Incorporation, Complex verbs, Idioms).

**Magdolna Kovács – Gábor Olaszy – Péter Nikléczy – Mária Gósy: Magyar nyelvi beszédtechnológiai alapismeretek. Interdiszciplináris, multimédiás szoftver számítógépre [Fundamentals of Hungarian speech technology. An interdisciplinary multimedia CD-ROM]**. Nikol Kkt, Budapest, 2002.

Speech technology is a new field of science. Its rapid development began in the last decades of the twentieth century. It takes up former and most recent results of traditional speech research and uses them in the framework of artificial intelligence in the research on information technology and its applications. The range of these applications is rather wide, the most important areas being speech recognition, speaker identification through voice, automatic speech generation from written text, speech therapy, new types of hearing screening, etc. The material of the CD-ROM (550 Mbytes, 4600 files, presenting the material in a total of 620 screen pages in the form of pictures, texts, speech, animations and examples) shows how wide-ranging interdisciplinary knowledge (of linguistics, phonetics, physiology, acoustics, mathematics, informatics, electrical engineering) is needed if we want to substitute one side of the human verbal communication process by a machine. Satisfactory results in speech technology research and its applications can be achieved only if we combine the knowledge of all these fields and find a common language for them.

The CD uses up-to-date multimedia technology combined with some digital speech processing techniques like slowing down and speeding up speech items, displaying the melody form, zooming on the waveform, making measurements of the timing of sounds, making sound boundaries in the speech item visible, etc.) The content of the CD is organised in three hierarchical levels. Its nine main chapters cover a range of topics from speech production and hearing to digital speech processing. The main chapters are divided into sections as follows. 1. Introduction (1.1. The speech chain; 1.2. The languages of the world; 1.3. Glossary of technical terms); 2. Speech and hearing (2.1. The respiratory system; 2.2. The larynx; 2.3. Articulation; 2.4. The ear; 2.5. Speech and the brain); 3. The fundamentals of acoustics (3.1. The sound wave; 3.2. Types of vibrations; 3.3. Resonance); 4. Speech acoustics (4.1. Basic units; 4.2. Time structure; 4.3. Frequency structure; 4.4. Intensity structure; 4.5. Sound boundaries);

5. Hungarian speech (5.1. Preliminaries; 5.2. Vowels; 5.3. Consonants; 5.4. Prosody; 5.5. Sound surgery; 5.6. Comparing features); 6. Speech databases (6.1. Requirements; 6.2. Variability in speech; 6.3. Design for recognition and synthesis); 7. Speech synthesis (7.1. The basics from Kempelen onwards; 7.2. Limited vocabulary; 7.3. Text-to-speech systems; 7.4. Development tools; 7.5. Practical applications); 8. Speech recognition (8.1. Basic principles; 8.2. Isolated word recognition; 8.3. Connected word recognition; 8.4. Continuous recognition; 8.5. Speaker identification; 8.6. Applications); 9. Signal processing (9.1. Basic principles; 9.2. Methods). The sections are further divided into individual topics. For example, section 7.1 contains five topics: 7.1.1. Farkas Kempelen; 7.1.2. Reconstruction of Kempelen's speaking machine; 7.1.3. Speech sounds, syllables and words generated in 2001 with the technology from 1791; 7.1.4. The first patent for TTS conversion of the world; 7.1.5. The first Hungarian TTS system.

The material of the CD is written with scientific aspirations but in an everyday style. Therefore, a wide range of people can use it successfully, from students to researchers, teachers, or engineers. A glossary is provided to clarify the meaning of the scientific terms used.

**Viktor Trón: Fejközpontú frázisstruktúra-nyelvtan. Segédkönyvek a nyelvészet tanulmányozásához IX. Nem transzformációs nyelvtanok II [Head-Driven Phrase Structure Grammar. Supplementary textbooks on linguistics 9. Non-transformational grammars 2]**. Tinta Könyvkiadó, Budapest, 2001. 184 pp.

Constraint-based grammatical theories are ever more successful alternatives to Chomskyan transformational grammar and its later versions within the generative linguistic paradigm. Though constraint-based models are used in virtually all competence-based natural language processing systems, they are ignored by many linguists and as a consequence, are still missing from the curriculum of most university programs claiming to teach modern linguistics. The non-transformational grammars series of Tinta aims at doing justice to these approaches. Viktor Trón's book (henceforward 'FFNy') is the second volume in the series. FFNy is an introduction to a linguistic theory called Head-Driven Phrase Structure Grammar (abbreviated as HPSG), which is the most well-developed and probably most widely used instance of constraint-based grammars. The book is unique since no comparable introductory work on HPSG has been published in other languages, either. FFNy assumes some preliminary linguistic background, and is written in the hope that it may serve as a course reader for Masters students in Linguistics. FFNy is mainly for the linguistically oriented, and offers little to those interested in the formal aspects of the representations used in HPSG or in the computational issues related to constraint-based models in general.

The book starts with a lengthy historical overview of linguistic approaches and addresses the place of HPSG relative to alternative frameworks, addressing influences, points of contact as well as important similarities and differences between them. This makes it a useful point of reference for those also who want to make sense of such terms as 'constraint-based', 'declarative' or 'lexicalist'. The other five chapters of the book gradually introduce the inventory of concepts and analytical tools which are commonly used in HPSG descriptions. The chapters demonstrate the strength of HPSG with addressing phenomena which have been given convincing treatments in the literature, such as argument raising and control, negation or non-local dependency constructions. The analyses are illustrated with detailed examples taken from several languages, among others French, German and English. Though FFNy naturally focuses on issues HPSG can handle with relative success, it is not entirely lacking critical evaluation of the framework. Contents: Introduction, The hierarchical lexicon, Phrase structure, Negation, auxiliaries and inversion, Argument structure, Non-local dependencies.

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Bárczi, Géza 1958a. Magyar hangtörténet [The historical phonology of Hungarian]. Akadémiai Kiadó, Budapest.

Bárczi, Géza 1958b. A szótövek [Word stems]. Akadémiai Kiadó, Budapest.

Brockhaus, Wiebke 1995. Skeletal and suprasegmental structure within Government Phonology. In: Jacques Durand – Francis Katamba (eds): Frontiers in phonology: Atoms, structures, derivations. 180–221. Longman, Harlow.

Cole, Jennifer 1995. The cycle in phonology. In: Goldsmith (1995): 206–44.

Goldsmith, John A. (ed.) 1995. The handbook of phonological theory. Blackwell, Cambridge MA and Oxford.

Kaye, Jonathan – Jean Lowenstamm – Jean-Roger Vergnaud 1990. Constituent structure and government in phonology. In: Phonology 7: 301–30.

Tomioka, Satoshi 1997. Focusing effects and NP-interpretation in VP-ellipsis. Doctoral dissertation, University of Massachusetts, Amherst.


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```
(1) (a) A   sólymaid            elszálltak
        the falcon-gen-pl-2sg away-flew-3pl
        'Your falcons have flown away.'
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Examples can be referred to in the text as (1a), (1a–d), etc.

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